Epps's REFERENCE BOOK OF FACTS AND FIGURES

MONEY
WEIGHTS
MEASURES
INTEREST
GEOGRAPHICAL
ASTRONOMICAL

THIRD EDITION

Published by
JAMES EPPS & CO., LIMITED
COCOA & CHOCOLATE MANUFACTURERS
HOLLAND STREET, BLACKFRIARS, LONDON, S.E. (ENG.)

EPPS'S
Custard Powder

Manufactured in three Flavours

VANILLA · ALMOND & STANDARD

Guaranteed Superfine Quality

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[1920]

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THE MULTIPLICATION TABLE AT A GLANCE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

EXTENDED MULTIPLICATION TABLE.

13 times	14 times	15 times	16 times	17 times	18 times	19 times
1 are 13	1 are 14	1 are 15	1 are 16	1 are 17	1 are 18	1 are 19
2 ,, 26	2 ,, 28	2 ,, 30	2 ,, 32	2 ,, 34	2 ,, 36	2 ,, 38
3 ,, 39	3 ,, 42	3 ,, 45	3 ,, 48	3 ,, 51	3 ,, 54	3 ,, 57
4 ,, 52	4 ,, 56	4 ,, 60	4 ,, 64	4 ,, 68	4 ,, 72	4 ,, 76
5 ,, 65	5 ,, 70	5 ,, 75	5 ,, 80	5 ,, 85	5 ,, 90	5 ,, 95
6 ,, 78	6 ,, 84	6 ,, 90	6 ,, 96	6 ,, 102	6 ,, 108	6 ,, 114
7 ,, 91	7 ,, 98	7 ,, 105	7 ,, 112	7 ,, 119	7 ,, 126	7 ,, 133
8 ,, 104	8 ,, 112	8 ,, 120	8 ,, 128	8 ,, 136	8 ,, 144	8 ,, 152
9 ,, 117	9 ,, 126	9 ,, 135	9 ,, 144	9 ,, 153	9 ,, 162	9 ,, 171
10 ,, 130	10 ,, 140	10 ,, 150	10 ,, 160	10 ,, 170	10 ,, 180	10 ,, 190
11 ,, 143	11 ,, 154	11 ,, 165	11 ,, 176	11 ,, 187	11 ,, 198	11 ,, 209
12 ,, 156	12 ,, 168	12 ,, 180	12 ,, 192	12 ,, 204	12 ,, 216	12 ,, 228
13 ,, 169	13 ,, 182	13 ,, 195	13 ,, 208	13 ,, 221	13 ,, 234	13 ,, 247
14 ,, 182	14 ,, 196	14 ,, 210	14 ,, 224	14 ,, 238	14 ,, 252	14 ,, 266
15 ,, 195	15 ,, 210	15 ,, 225	15 ,, 240	15 ,, 255	15 ,, 270	15 ,, 285
16 ,, 208	16 ,, 224	16 ,, 240	16 ,, 256	16 ,, 272	16 ,, 288	16 ,, 304
17 ,, 221	17 ,, 238	17 ,, 255	17 ,, 272	17 ,, 289	17 ,, 306	17 ,, 323
18 ,, 234	18 ,, 252	18 ,, 270	18 ,, 288	18 ,, 306	18 ,, 324	18 ,, 342
19 ,, 247	19 ,, 266	19 ,, 285	19 ,, 304	19 ,, 323	19 ,, 342	19 ,, 361
20 ,, 260	20 ,, 280	20 ,, 300	20 ,, 320	20 ,, 340	20 ,, 360	20 ,, 380

EPPS'S Sola Chocolate has a refined vanilla flavou

RENT AND WAGES TABLE.

(To nearest Farthing for Year of 52 Weeks).

Per Annum.	Per Month.	Per Week.	Per Annum.	Per Month.	Per Week.
£1	1/8	4⅓d.	£27	45/-	10/4½
£2	3/4	9¼d.	£28	46/8	10/9¼
£3	5/-	1/1¾	£29	48/4	11/1¾
£4	6/8	1/6½	£30	50/-	11/6½
£5	8/4	1/11	£31	51/8	11/11
£6	10/-	2/3¾	£32	53/4	12/3¾
£7	11/8	2/8¼	£33	55/-	12/8¼
£8	13/4	3/1	£34	56/8	13/1
£9	15/-	3/5½	£35	58/4	13/5½
£10	16/8	3/10¼	£36	60/-	13/10¼
£11	18/4	4/2¾	£37	61/8	14/2¾
£12	20/-	4/7½	£38	63/4	14/7½
£13	21/8	5/-	£39	65/-	15/-
£14	23/4	5/4½	£40	66/8	15/4½
£15	25/-	5/9¼	£41	68/4	15/9¼
£16	26/8	6/1¾	£42	70/-	16/1¾
£17	28/4	6/6½	£43	71/8	16/6½
£18	30/-	6/11	£44	73/4	16/11
£19	31/8	7/3¾	£45	75/-	17/3¾
£20	33/4	7/8¼	£46	76/8	17/8¼
£21	35/-	8/1	£47	78/4	18/1
£22	36/8	8/5½	£48	80/-	18/5½
£23	38/4	8/10¼	£49	81/8	18/10¼
£24	40/-	9/2¾	£50	83/4	19/2¾
£25	41/8	9/7½	£51	85/-	19/7½
£26	43/4	10/-	£52	86/8	20/-

EPPS'S COCOA, Grateful and Comforting.

DISCOUNTS.

	s.	d.			s.	d.
$1\frac{1}{4}$ per cent. is ...	0	3	in the pound.	20 per cent. is...	4	0	in the pound.
$2\frac{1}{2}$,,	0	6		$22\frac{1}{2}$,,	4	6	
5 ,,	1	0		25 ,,	5	0	
$7\frac{1}{2}$,,	1	6		30 ,,	6	0	
10 ,,	2	0		$33\frac{1}{3}$,,	6	8	
$12\frac{1}{2}$,,	2	6		35 ,,	7	0	
15 ,,	3	0		40 ,,	8	0	
$17\frac{1}{2}$,,	3	6		50 ,,	10	0	

DECIMAL PARTS AND THEIR EQUIVALENT VULGAR FRACTIONS.

·875 = $\frac{7}{8}$ = seven-eighths.	·375 = $\frac{3}{8}$ = three-eighths.
·75 = $\frac{3}{4}$ = three-quarters.	·25 = $\frac{1}{4}$ = one-quarter.
·625 = $\frac{5}{8}$ = five-eighths.	·125 = $\frac{1}{8}$ = one-eighth.
·5 = $\frac{1}{2}$ = one-half.	·1 = $\frac{1}{10}$ = one-tenth.

TIME WHEN MONEY DOUBLES ITSELF AT INTEREST.

Per Cent.	Simple Interest.	Compound Interst.
25	4 years.	$3\frac{1}{10}$ years
$22\frac{1}{2}$	$4\frac{4}{9}$,,	$3\frac{5}{12}$,,
20	5 ,,	$3\frac{5}{6}$,,
$17\frac{1}{2}$	$5\frac{5}{7}$,,	$4\frac{1}{3}$,,
15	$6\frac{2}{3}$,,	5 ,,
$12\frac{1}{2}$	8 ,,	$5\frac{5}{6}$,,
10	10 ,,	$7\frac{1}{4}$,,
9	$11\frac{1}{9}$,,	8 ,,
8	$12\frac{1}{2}$,,	9 ,,
7	$14\frac{2}{7}$,,	$10\frac{1}{4}$,,
6	$16\frac{2}{3}$,,	$11\frac{5}{6}$,,
5	20 ,,	$14\frac{1}{5}$,,
4	25 ,,	$17\frac{3}{4}$,,
3	$33\frac{1}{3}$,,	23 ,,
$2\frac{1}{2}$	40 ,,	$28\frac{1}{15}$,,

EPPS'S COCOA, Grateful and Comforting.

TABLES OF WEIGHTS AND MEASURES.

Note.—The grain in the three systems beneath is the same; the ounce Troy is the same as ounce Apothecaries, 480 grains, but ounce Avoirdupois has 437½. The dram Avoirdupois is less than half the drachm Apothecaries.

AVOIRDUPOIS WEIGHT

16 Drams (*dr.*)	1 Ounce	*oz.*
16 Ounces	1 Pound	*lb.*
437½ Grains	1 Ounce	*oz.*
7,000 Grains	1 Pound	*lb.*
14 Pounds	1 Stone	*st.*
8 Pounds	1 Stone (Butcher's)	*st.*
28 Pounds	1 Quarter	*qr.*
4 Quarters	1 Hundredweight	*cwt.*
20 Hundredweights	1 Ton	*ton.*

Drs.	Ozs.	Lbs.	St.	Qrs.	Cwt.	Cwt.
16	1					
256	16	1				
3,584	224	14	1			
7,168	448	28	2	1		
28,672	1,792	112	8	4	1	
573,440	35,840	2,240	160	80	20	1

Used for weighing common and heavy goods, and for all general purposes. A Stone (*St.*) = 14 lbs.

TROY WEIGHT.

24 Grains (*gr.*)	1 Pennyweight	*dwt.*
20 Pennyweights	1 Ounce	*oz.*

Used for weighing gold, silver, jewels, and precious stones.
A Carat = 3·17 grains.

APOTHECARIES' WEIGHT.

(PRIOR TO 1864).

20 Grains (*gr.*)	1 Scruple	℈
3 Scruples	1 Drachm	ʒ
8 Drachms	1 Ounce	℥

Used in mixing medicines; but drugs are bought and sold by Avoirdupois weight when sold in ozs and lbs

The following changes were introduced in 1864:—

437½ grains = 1 ounce. 16 ounces = 1 pound

EPPS'S COCOA nourishes and sustains.

APOTHECARIES' FLUID MEASURE.

60	Minims (*m.*)	1	Drachm (*f* ℥).
8	Drachms	1	Ounce (*f* ℥).
20	Ounces	1	Pint (℔).
8	Pints	1	Gallon.
1	Minim	1	Grain.
60	Drops	1	Drachm.
1	Drachm	1	Tea-spoonful.
2	Drachms	1	Dessert-spoonful.
4	Drachms	1	Table-spoonful.
2	Ounces (℥)	1	Wine-glassful.
3	Ounces	1	Tea-cupful.

COAL MEASURE.

112 lbs. = 1 cwt. — 1 Large Sack = 2 cwt.
1 Sack = 1 cwt. — 10 Large Sacks = 1 Ton.

COKE MEASURE.

3 Bushels = 1 Sack. — 12 Sacks = 1 Chaldron.

LINEAL OR LONG MEASURE.

12	Inches (*in.*)	1	Foot	*ft.*
3	Feet	1	Yard	*yd.*
5½	Yards	1	Rod, pole, or perch	*po.*
40	Poles	1	Furlong	*fur.*
8	Furlongs	1	Mile	*m.*

In.	Ft.	Yds.	Po.	Fur.	M.
12	1				
36	3	1			
198	16½	5½	1		
7,920	666	220	40	1	
63,360	5,280	1,760	320	8	1

EPPS'S COCOA for breakfast giv

OTHER LINEAL MEASURES.

3	Barleycorns	1 Inch.
4	Inches	1 Hand.
7·92	Inches	1 Link.
9	Inches	1 Span.
6	Feet	1 Fathom.
120	Fathoms	1 Cable length.
22	Yards	1 Chain.
100	Links	1 Chain.
10	Chains	1 Furlong.
3	Miles	1 League.
6,082	Feet	1 Nautical Mile.

The inch may now be legally divided into 10, 12, or 16 equal parts. The hand is used in finding the height of horses ; the fathom in finding the depths of water and mines ; and the chain in measuring land.

MILE MEASUREMENTS.

The English Statute Mile	= 1,760	yards.
The Scotch Mile	= 1,984	,,
The Irish Mile	= 2,240	,,
The Italian Mile	= 1,467	,,
The Spanish Mile	= 5,028	,,
The Geographical or Nautical Mile	= 2,026⅔	,,
The Russian Verst	= 1,168	,,
The Kilometre	= 1,092	,,
The Austrian Mile	= 8,296	,,

GUNTER'S CHAIN MEASURE (LINEAL).

7·92 Inches	= 1 Link.
100 Links, or 22 yards	= 1 Chain.
10 Chains	= 1 Furlong.
80 Chains	= 1 Mile.

Used in land surveying. The chain is 66 feet long, and is divided into 100 parts called links. A chain of 100 feet is also used for surveying.

nergy and zest for the day's labours.

*

CLOTH MEASURE.

2¼ Inches (*in.*)	1	Nail	*nl.*
4 Nails	1	Quarter	*qr.*
4 Quarters	1	Yard	*yd.*
5 Quarters	1	Ell	*ell.*
3 Quarters	1	Flemish Ell	*Fl. Ell.*
6 Quarters	1	French Ell	*Fr. Ell.*

Used by drapers for measuring linens, woollens, muslins, ribbons, etc.

LAND OR SQUARE MEASURE.

144 Square Inches (*sq. in.*)	1	Square Foot	*sq. ft.*
9 Square Feet	1	Square Yard	*sq. yd.*
30¼ Square Yards	1	Square Rod, Pole, Perch	*sq. po.*
40 Poles	1	Rood	*rd.*
4 Roods	1	Acre	*ac.*
640 Acres	1	Square Mile	*sq. m.*

Sq. In.	Sq. Ft.	Sq. Yds.	Sq. Perch.	Rood.	Ac.
144	1				
1,296	9	1			
39,204	272¼	30¼	1		
1,568,160	10,890	1,210	40	1	
6,272,640	43,560	4,840	160	4	1

Used for measuring surfaces, and all things that have length and breadth.

OTHER MEASURES.

100 Square Feet	= 1 square of flooring.
272½ ,, ,,	= 1 rod of brickwork.
30 Acres	= 1 yard of land.
100 ,,	= 1 hide of land.
40 Hides	= 1 barony.

TIMBER MEASURE.

40 Cubic Feet, unhewed, 50 Cubic Feet Squared = 1 load
50 Cubic Feet of Planks = 1 load.
100 Superficial Feet = 1 sq. of flooring.

A Standard Hundred of Deals contains 120 pieces.

The Petersburg Standard consists of 165 cubic feet, or 120 pieces 1½″ × 11″ × 12′ or 120 pieces 3″ × 11″ × 6′. A Batten is not more than 7″ wide, a Deal not more than 9″; Planks are 2″ to 4″ thick, and 10″ and up in width.

A Cord of wood is 2½ tons, or 128 cubic feet.

EPPS'S COCOA, Grateful and Comforting.

GUNTER'S CHAIN MEASURE (SQUARE).

144	Square Inches	=	2 295 Square Links.
20·655	Square Links	=	1 Square Yard.
625	Square Links	=	1 Square Pole.
10,000	Square Links	=	1 Square Chain.
25,000	Square Links	=	1 Rood.
100,000	Square Links	=	1 Acre.

CUBIC OR SOLID MEASURE.

1,728	Cubic Inches (*cub. in*)	1 Cubic Foot ...	*cub. ft.*
27	Cubic Feet	1 Cubic Yard ...	*cub. yd.*
40	Cubic Feet of round timber, or 50 Cubic Feet of hewn timber	=	1 ton or load.
42	Cubic Feet.....	=	1 ton of shipping.
108	,, ...	=	1 stack of wood.
128	,, ...	=	1 cord of wood.
277¼	Cubic Inches of water	=	1 Imperial gallon.

AREA AND VOLUMES.

All the measurements must be made in the same unit, *i.e.*, if diameter is in inches the length must also be in inches, and areas will then be in sq. inches, volumes in cub. inches.

Triangle.—Area: Draw a line from one corner at right-angles to the opposite side; measure the line and the opposite side; multiply these two together, and halve the result.

Circle.—Circumference: Multiply the diameter by $\frac{22}{7}$ (3·1416).

Area: Multiply the diameter by itself, and the result by $\frac{11}{14}$ (·7854), or multiply the square of the radius by $\frac{22}{7}$ (3·1416)

Cylinder.—Circumference measured like circle.

Area of end ,, ,, ,,

Area of sides = circumference × length of side.

Volume = area of end × length of side.

Monarch Cocoa has a perfect flavour.

MEASURES OF CAPACITY.

The unit capacity is the *gallon.* The *Imperial Gallon* contains 277·274 cub. in of distilled water at the temperature of 62° F., with the barometer standing at 30 inches, and weighs 10 lbs. of distilled water.

4 Gills (*gi.*)	1 Pint	*pt.*
2 Pints	1 Quart	*qt.*
4 Quarts	1 Gallon	*gal.*
2 Gallons	1 Peck	*pk.*
4 Pecks	1 Bushel	*bush.*
8 Bushels	1 Quarter	*qr.*
36 Bushels	1 Chaldron	*chal.*

Gill.	Pint.	Quart.	Gal.	Peck.	Bush.	Qr.
4	1					
8	2	1				
32	8	4	1			
64	16	8	2	1		
256	64	32	8	4	1	
2,048	512	256	64	32	8	1

This Measure is used for corn and all dry goods. In some markets such goods are sold by weight. In Liverpool they are sold by the Cental, or 100 pounds. But in some markets the weight of a bushel of wheat is 60 lbs., of barley 47 lbs., and of oats 28 lbs. Grain is frequently sold by the Stone of 14 lbs.

WINE MEASURE.

4 Gills or Noggins	= 1 Pint	*pt.*
2 Pints	= 1 Quart	*qt.*
4 Quarts	= 1 Gallon	*gal.*
10 Gallons	= 1 Anker	*ank.*
18 Gallons	= 1 Runlet	*run.*
42 Gallons	= 1 Tierce	*tierce.*
63 Gallons	= 1 Hogshead	*hhd.*
84 Gallons	= 1 Puncheon	*pun.*
126 Gallons	= 1 Pipe or Butt	*pipe.*
252 Gallons	= 1 Tun	*tun.*

All Pipes of Wine do not contain 126 Gallons.

A cup of EPPS'S at supper tim

WINE MEASURE—*continued.*

A Pipe of Madeira contains	.....	92 Gallons.
A Pipe of Cape Wine ,,	.....	92 ,,
A Pipe of Sherry Wine ,,	.....	108 ,,
A Pipe of Brandy ,,	.....	114 ,,
A Pipe of Port Wine ,,	.....	115 ,,

All wines, spirits, cider, perry and vinegar are dealt with by this measure.

A bottle of wine contains a pint and a half, or about 6 to a gallon.

ALE AND BEER MEASURE.

2 Pints	=	1 Quart	.....	*qt.*
4 Quarts	=	1 Gallon	.....	*gal.*
9 Gallons	=	1 Firkin	.....	*fir.*
18 Gallons	=	1 Kilderkin	.....	*kil.*
36 Gallons	=	1 Barrel	.....	*bar.*
54 Gallons	=	1 Hogshead	.....	*hhd.*
2 Barrels	=	1 Puncheon	.....	*pun.*
3 Barrels	=	1 Butt	.....	*butt.*

Ale and Beer are also sold in 4½ Gallon casks, and in Pint and Half-pint bottles. Six Pint bottles to the Gallon.

MISCELLANEOUS TABLES.

WOOL WEIGHT.

7 Pounds	=	1 Clove	.....	*cl.*
2 Cloves	=	1 Stone	.....	*st.*
2 Stones	=	1 Tod	.....	*tod.*
6½ Tods	=	1 Wey	.....	*wey.*
2 Weys	=	1 Sack	.....	*sk.*
12 Sacks	=	1 Last	.....	*last.*
240 Pounds	=	1 Pack	.....	*pk.*

promotes a peaceful slumber.

WEIGHT TABLE.

lb.	Qr.	Cwt.	Ton.	lb.	Qr.	Cwt.	Ton.
¼	7	2/4	46/8	4½	10/6	42/0	840/0
⅜	10½	3/6	70/0	4⅝	10/9½	43/2	863/4
½	1/2	4/8	93/4	4¾	11/1	44/4	886/8
⅝	1/5½	5/10	116/8	4⅞	11/4½	45/6	910/0
¾	1/9	7/0	140/0	5	11/8	46/8	933/4
⅞	2/0½	8/2	163/4	5⅛	11/11½	47/10	956/8
1	2/4	9/4	186/8	5¼	12/3	49/0	980/0
1⅛	2/7½	10/6	210/0	5½	12/10	51/4	1026/8
1¼	2/11	11/8	233/4	5¾	13/5	53/8	1073/4
1⅜	3/2½	12/10	256/8	6	14/0	56/0	1120/0
1½	3/6	14/0	280/0	6¼	14/7	58/4	1166/8
1⅝	3/9½	15/2	303/4	6½	15/2	60/8	1213/4
1¾	4/1	16/4	326/8	6¾	15/9	63/0	1260/0
1⅞	4/4½	17/6	350/0	7	16/4	65/4	1306/8
2	4/8	18/8	373/4	7¼	16/11	67/8	1353/4
2⅛	4/11½	19/10	396/8	7½	17/6	70/0	1400/0
2¼	5/3	21/0	420/0	7¾	18/1	72/4	1446/8
2⅜	5/6½	22/2	443/4	8	18/8	74/8	1493/4
2½	5/10	23/4	466/8	8¼	19/3	77/0	1540/0
2⅝	6/1½	24/6	490/0	8½	19/10	79/4	1586/8
2¾	6/5	25/8	513/4	8¾	20/5	81/8	1633/4
2⅞	6/8½	26/10	536/8	9	21/0	84/0	1680/0
3	7/0	28/0	560/0	9¼	21/7	86/4	1726/8
3⅛	7/3½	29/2	583/4	9½	22/2	88/8	1773/4
3¼	7/7	30/4	606/8	9¾	22/9	91/0	1820/0
3⅜	7/10½	31/6	630/0	10	23/4	93/4	1866/8
3½	8/2	32/8	653/4	10¼	23/11	95/8	1913/4
3⅝	8/5½	33/10	676/8	10½	24/6	98/0	1960/0
3¾	8/9	35/0	700/0	10¾	25/1	100/4	2006/8
3⅞	9/0½	36/2	723/4	11	25/8	102/8	2053/4
4	9/4	37/4	746/8	11¼	26/3	105/0	2120/0
4⅛	9/7½	38/6	770/0	11½	26/10	107/4	2146/8
4¼	9/11	39/8	793/4	11¾	27/5	109/8	2193/4
4⅜	10/2½	40/10	816/8	1/-	28/0	112/0	2240/0

EPPS'S COCOA, Grateful and Comforting.

PAPER TABLES.

24 Sheets	1 Quire.	20 Sheets	1 Quire outsides.
20 Quires	1 Ream.	25 ,,	1 ,, printers.
2 Reams	1 Bundle.	43 Quires	1 Bundle ,,
5 Bundles	1 Bale.	60 Skins or 5 doz.	1 Roll of parchment.

SIZES OF PRINTING PAPER.

	In.		In.		In.		In.
Foolscap	13½	×	17	Double Foolscap	17	×	27
Crown	15	×	20	Large Post	16½	×	21
Post	15¼	×	19	Double Crown	20	×	30
Demy	17½	×	22½	Double Demy	22½	×	35
Royal	20	×	25	Quad Crown	30	×	40
Imperial	22	×	30	Quad Demy	35	×	45

SIZES OF DRAWING PAPER.

	In.		In.		In.		In.
Emperor	72	×	48	Royal	24	×	19
Antiquarian	53	×	31	Medium	22	×	17½
Double Elephant	40	×	26¾	Large Post	21	×	16½
Atlas	34	×	26	Copy	20	×	16
Colombier	34½	×	23½	Demy	20	×	15½
Imperial	30	×	22	Post	19	×	15¼
Elephant	28	×	23	Foolscap	16¾	×	13¼
Super Royal	27	×	19	Pott	15	×	12½

SIZES OF BOOKS.

Fo. = Folio	Sheet folded into	2	leaves or	4	pages.	
4to = Quarto	,,	,,	4	,,	8	,,
8vo = Octavo	,,	,,	8	,,	16	,,
12mo = Duodecimo	,,	,,	12	,,	24	,,
16mo = Sexodecimo	,,	,,	16	,,	32	,,
18mo = Octodecimo	,,	,,	18	,,	36	,,
24mo, 32mo, 48mo, 72mo, &c.	,,		24 &c. or 48 &c.			

Children thrive on EPPS'S COCOA.

HAY AND STRAW WEIGHT.

36 Pounds	1 Truss of straw	*tr.*
56 Pounds	1 Truss of old hay	*tr.*
60 Pounds	1 Truss of new hay	*tr.*
36 Trusses	1 Load	*ld.*

1 Load of straw weighs 11 cwts. 2 qrs. 8 lbs.
1 Load of old hay weighs 18 cwts.
1 Load of new hay weighs 19 cwts. 1 qr. 4 lbs.

BREAD AND FLOUR WEIGHT.

	Lbs.	ozs.	drs.
A Peck Loaf weighs	17	6	2
A Half-peck Loaf weighs	8	11	1
A Quartern Loaf weighs	4	5	8½
A Quartern (or Quarter-peck) of Flour	3	8	0
A Peck or Stone of Flour weighs	14	0	0
A Bushel or 4 Pecks of Flour weighs	56	0	0
Five Bushels or a sack of Flour weighs	280	0	0

Bread is now sold in 4 lb. and 2 lb. loaves. The baker is obliged to weigh bread at the time of purchase, and forbidden to sell it by the Peck or Quartern.

MEASURES OF TIME.

TIME TABLE

60 Seconds *(sec.)*	1 Minute *(min.)*
60 Minutes	1 Hour *(hr.)*
24 Hours	1 Day *(dy.)*
7 days	1 Week *(wk.)*
4 Weeks	1 Lunar Month.
13 Lunar Months, / 12 Calendar Months, or / 365 Days	1 Year.
366 Days	1 Leap Year.
10 Years	1 Decade.
100 Years	1 Century.

Monarch Cocoa is unsurpas

Secs.	Mins.	Hours.	Days.	Weeks.	Lunar Month
60	1				
3,600	60	1			
86,400	1,440	24	1		
604,800	10,080	168	7	1	
2,419,200	40,320	672	28	4	1

A Solar Day..... = 24 hrs.
A Lunar Day ..... = 23 hrs. 48 mins.
A Julian Year..... = 365 days 6 hours.
A Solar Year..... = 365 days 5 hrs. 48 mins. 57 secs.

The Number of days in each Calendar Month.

January..... 31	May..... 31	September..... 30
February..... 28	June 30	October 31
(29 in leap years)	July 31	November..... 30
March 31	August 31	December 31
April 30		

Thirty days hath September,
April, June, and November;
February hath twenty-eight alone,
And all the rest have thirty-one.
Except in leap year, then's the time
When February's days are twenty-nine.

Since the earth goes round the sun in 365 days 5 hours 48 minutes 57 seconds, and an ordinary year has only 365 days, there must be added in each 100 years 581¼ hours; *i.e.*, 24¼ days approx. There must therefore be 24 leap years in each century, and one extra in each four centuries. The years ending 00 are not leap years unless the *first two numbers* are divisible by 4; other years are leap years if they are divisible by 4.

for strength, flavour and purity.

**

QUARTER DAYS.

ENGLAND AND IRELAND.

Lady Day.....March 25th	Michaelmas Day, Sept. 29th
Midsummer Day, June 24th	Christmas Day ...Dec. 25th

SCOTLAND.

Candlemas ...February 2nd	Lammas .....August 1st
Whit Sunday .....May 15th	Martinmas...November 11th

THE SEASONS.

Spring commences March 21st *(Vernal Equinox).*
Summer ,, June 21st *(Summer Solstice).*
Autumn ,, September 23rd *(Autumn Equinox).*
Winter ,, December 21st *(Winter Solstice).*

A Table showing the number of days from any day of one month, to the same day of any other month.

From \ To	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
January	365	31	59	90	120	151	181	212	243	273	304	334
February	334	365	28	59	89	120	150	181	212	242	273	303
March	306	337	365	31	61	92	122	153	184	214	245	275
April	275	306	334	365	30	61	91	122	153	183	214	245
May	245	276	304	335	365	31	61	92	123	153	184	214
June	214	245	273	304	334	365	30	61	92	122	153	183
July	184	215	243	274	304	335	365	31	62	92	122	153
August.....	153	184	212	243	273	304	334	365	31	61	92	122
September	122	153	181	212	242	273	303	334	365	30	61	91
October	92	123	151	182	212	243	273	304	335	365	31	61
November	61	92	120	151	181	212	242	273	304	334	365	30
December	31	62	90	121	151	182	212	243	274	304	335	365

N.B.—If the end of February be in the time, and it is leap-year, one day must be added.

The longest day of the year is June 21st, and the shortest December 21st.

EPPS'S COCOA, Grateful and Comforting.

THE METRIC SYSTEM.

OF WEIGHTS AND MEASURES.

Used in France, Belgium, Norway, Germany, Austria, Portugal, Spain, and Italy; and under different names in Holland and Greece. The system is also legal, though not compulsory, in England and the United States.

It was established in France in 1801. The *Metre*, which gives the name to the system, is the basis from which all other measurements are derived, and the unit of length. It is the ten-millionth part of the distance between the Equator and either Pole, and measures 39·3708 English inches.

In the metric or decimal system a convenient measure or weight is taken as the *unit;* all other weights or measures are multiples or sub-multiples (decimal parts) of the unit.

To indicate *multiples* of the unit, four *Greek* prefixes are used viz:—**Deka, Hekto, Kilo,** and **Myria.**

Deka	signifies	10	times the unit.
Hekto	,,	100	,,
Kilo	,,	1,000	,,
Myria	,,	10,000	,,

To indicate sub-multiples, or parts of the unit, three *Latin* prefixes are used, viz:—**Deci, Centi,** and **Milli.**

Deci	signifies	$\frac{1}{10}$ of the unit.
Centi	,,	$\frac{1}{100}$,,
Milli	,,	$\frac{1}{1000}$,,

The Unit of Linear Measure is the		*Metre*	= 39·3708 inches.
,,	Square Measure ,,	*Are*	= a sq. Dekametre.
,,	Cubic Measure ,,	*Stere*	= a cubic metre.
,,	Weight Measure ,,	*Gramme*	= a cu. Centimetre of water.
,,	Capacity Measure ,,	*Litre*	= a cu. Decimetre.

EPPS'S Chocolates suit every palate.

METRIC WEIGHTS AND MEASURES.

LINEAR MEASURE.

The Metre is the Unit.

			Eng. Inch.
10 *Millimetres*	= 1	Centimetre (*c.m.*)	= ·393708
10 *Centimetres*	= 1	Decimetre	= 3·93708
10 *Decimetres*	= 1	Metre	= 39·3708
10 Metres	= 1	Dekametre	= 393·708
10 *Dekametres*	= 1	Hektometre	= 3937·08
10 *Hektometres*	= 1	Kilometre	= 39370·8

The Land Chain is one Dekametre in length, or 10 yards $2\frac{3}{4}$ inches. It is divided into 50 Links, each two Decimetres, or about $7\frac{3}{4}$ inches in length.

SQUARE MEASURE.

The Sq. Metre is the Unit.

100 Sq. Millimetres	= 1	Sq. Centimetre	= ·155006 sq. in.
100 Sq. Centimetres	= 1	Sq. Decimetre	= 15·5006 sq. in.
100 Sq. Decimetres	= 1	Sq. Metre	= 10·7643 sq. ft.
100 Sq. Metres	= 1	Sq. Dekametre	= 119·6033 sq. yds.
100 Sq. Dekametres	= 1	Sq. Hektometre	= 2 ac. 1 ro. 35 po.
100 Sq. Hektometres	= 1	Sq. Kilometre	= 246 ac. 3 ro. 20 po.

In Land Measurement the unit is 1 Are (100 Sq. Metres); other terms commonly used are Centiare (1 sq. metre), and Hektare (100 Are or 10,000 sq. metres).

CUBIC MEASURE.

The Cubic Metre or Stere is the Unit.

In the following table the multiples are 1,000 and the sub-multiples $\frac{1}{1000}$.

1,000 Cub. Millimetres	= 1	Cub. Centimetre (*c.c.*)	= ·06002 cub. in.
1,000 Cub. Centimetres	= 1	Cub. Decimetre	= 60·02 cub. in.
1,000 Cub. Decimetres	= 1	Cub. Metre	= 35·317 cub. ft.

Timber and firewood are measured by the Stere, which is the same as 1 cubic metre.

EPPS'S COCOA has the highest food value.

LIQUID MEASURE.

The Cubic Decimetre or Litre is the Unit, and is about 1¾ pints; it is 1 Cubic Decimetre, so that 1 Litre = 1000 Cubic Centimetres or $\frac{1}{1000}$ Cubic Metre.

			Eng. pints.
10 *Centi*litre	= 1 Decilitre	=	·1760773
10 *Deci*litre	= 1 Litre	=	1·760773
10 Litres	= 1 Dekalitre	=	17·60773
10 *Deka*litres	= 1 Hektolitre	=	176·0773
10 *Hekto*litres	= 1 Kilolitre	=	1760·773

WEIGHT.

The Gram is the Unit.

10 *Milli*grams	= 1 Centigram	=	0·154
10 *Centi*grams	= 1 Decigram	=	1·543
10 *Deci*grams	= 1 Gram	=	15·432
10 Grams	= 1 Dekagram	=	154·323
10 *Deka*grams	= 1 Hektogram	=	1543·234
10 *Hekto*grams	= 1 Kilogram	=	15432·341

1,000 Kilo = 2204·6 lbs. or very nearly 1 Ton, hence is often called the Metric Ton or Tonne.

∴ The unit, the *Gram*, is the weight of a Cubic Centimetre of water, at its greatest density, 4° C. or 39° F.

BRITISH MEASURES TO METRIC.

AVOIRDUPOIS WEIGHT.

1 Dram	= 1·772	Grams.
1 Ounce	= 28·352	Grams.
1 Pound	= 4·536	Hektograms, 453·6 Grams or ·4536 Kilos.
1 Stone	= 6·35	Kilograms.
1 Quarter	= 12·70	Kilograms.
1 Cwt.	= 50·80	Kilograms.
1 Ton	= 1,016	Kilos. or 1·016 Metric Tons.

Athletes train on EPPS'S COCOA.

BRITISH MEASURES TO METRIC.—*cont.*

TROY WEIGHT.

1 Grain ..... = ·0648 Grams = 64·8 Milligrams.
1 Pennyweight ..... = 1·5552 Grams.
1 Ounce ..... = 31 104 Grams.

APOTHECARIES' WEIGHT.

1 Grain ..... = ·0648 Grams = 64·8 Milligrams.
1 Scruple ..... = 1·296 Grams.
1 Drachm ..... = 3·888 Grams.
1 Ounce ..... = 31·104 Grams.

LINEAL MEASURE.

1 Inch ..... = 2·54 Centimetres.
1 Foot ..... = 3·048 Decimetres or 30·48 Cms.
1 Yard = ·914 metres = 9·144 Decimetres or 91·44 Cms.
1 Pole ..... = 5 0292 Metres.
1 Chain ..... = 20·1168 Metres.
1 Furlong ..... = 2·0116 Hektometres, very nearly $\frac{1}{8}$ Kilometre.
1 Mile ..... = 1·6092 Kilometres, approx. $\frac{8}{5}$ Kilo.

SQUARE MEASURE.

1 Square Inch ... = 6·4516 Square Centimetres.
1 Square Foot ... = 9·2903 Square Decimetres.
1 Square Yard ... = ·8361 Square Metres.
1 Square Perch... = 25·292 Square Metres, = nearly $\frac{1}{4}$ Are.
1 Rood ..... = 10·1168 Square Dekametres or Ares.
1 Acre ..... = 40 4472 Square Dekametres or Ares.
1 Square Mile ... = 2·5885 Square Kilometres or 2588·5 Ares.

CUBIC MEASURE.

1 Cubic Inch ..... = 16 388 Cubic Centimetres.
1 Cubic Foot ..... = 28·318 Cubic Decimetres.
1 Cubic Yard ..... = ·764 Cubic Metre.

EPPS'S COCOA, Grateful and Comforting.

BRITISH MEASURES TO METRIC.—*cont.*

MEASURES OF CAPACITY.

APOTHECARIES' MEASURE.

1 Minim ..... = ·059 Cubic Centimetres.
1 Fluid Dram ... = 3·552 Cubic Centimetres.
1 Fluid Ounce... = 2·84 Cubic Centilitres or 28·4 Cub. Cms.
1 Pint ..... = 5·681 Litre = 568 Cub. Cms.
1 Gallon ..... = 4·5448 Litres.

LIQUID MEASURE.

1 Gill ..... = ·142 Litre or 142 Cub. Cms.
1 Pint ..... = ·568 Litre or 568 Cub. Cms.
1 Quart ..... = 1·136 Litre.
1 Gallon..... = 4·544 Litres.

DRY MEASURE.

1 Peck ..... = 9·088 Litres.
1 Bushel..... = 3·635 Dekalitres = 36·35 Litres.
1 Quarter ..... = 2·908 Hektolitres = 290·8 Litres.

TO CONVERT METRIC TO BRITISH MEASURES.

LENGTH.

A Millimetre = ·03937 (nearly $\frac{1}{25}$ inch.)
,, Centimetre = ·393 (nearly $\frac{2}{5}$ inch.)
,, Decimetre = 3·937 ins. (nearly 4 inches.)
,, Metre..... = 39·37 Inches = 1·093 Yards (1 yd. $3\frac{1}{3}$ ins.)
,, Dekametre = 10·936 (nearly 11 Yards).
,, Hektometre= 109 Yards 1 Foot.
,, Kilometre = 1093·5 Yards.

8 Kilometres are very nearly equal to 5 miles, or 1 Kilometre equals $\frac{5}{8}$ mile.

EPPS'S COCOA is a beverage and a FOOD.

TO CONVERT METRIC TO BRITISH MEASURES.—*continued.*

SQUARE MEASURE.

An Are is very nearly 119½ sq. yards = very nearly 4 Rods.
A Dekare (10 Are) ..... = very nearly ¼ Acre.
A Hektare (100 Are) ..... = 2·47 (nearly 2½) Acres.
A Sq. Kilometre ..... = 247 Acres, roughly ⅜ sq. Mile.

CUBIC MEASURE.

1 Cubic Centimetre ... = ·060 Cub. In. (about $\frac{1}{16}$.)
1 Cubic Decimetre ... = 60·02 Cub. In.
1 Cubic Metre ..... = 35·317 Cub. Ft. = 1·308 Cub. Yds.
1 Stere ..... = 1·308 Cub. Yds.

LIQUID MEASURE.

1 Decilitre ..... = 3·52 Liq. Oz.
1 Litre ..... = 1·760 (practically 1¾) Pints.
1 Dekalitre ..... = 17·607 Pints = 2·20 (about 2⅕) Gallons.
1 Hektolitre ..... = 176·07 Pints or almost exactly 22 Gallons.

WEIGHT.

1 Milligram = $\frac{1}{1000}$ Gram = ·0154 grains.
1 Centigram = $\frac{1}{100}$,, = ·154 ,, (between $\frac{1}{6}$ & $\frac{1}{7}$ grain)
1 Decigram = $\frac{1}{10}$,, = 1·54 ,,
1 Gram = 1 ,, = 15·4 ,, = ·564 drams, Avoir.
1 Dekagram = 10 Grams = nearly 6½ dwt. Troy, nearly ⅓ oz. Avoirdupois.
1 Hektogram = 100 ,, = ,, 3½ oz., Avoir.
1 Kilogram = 1,000 ,, = 35·27 (practically 35¼) oz. Avoir.
= 2·204 (practically 2⅕) lbs.
1,000 Kilos. (Metric ton) = 36 lbs. less than 1 English ton.

The firm of EPPS star

1. Tables showing the interest on various amounts, at sundry percentages, for one year.

RULE.—Multiply the amount by the rate per cent., and the product by the number of years, and divide the new product by 100.

Per Cent.

Amount	2			2½			3			3½			4		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
25		10	0		12	6		15	0		17	6	1	0	0
50	1	0	0	1	5	0	1	10	0	1	15	0	2	0	0
75	1	10	0	1	17	6	2	5	0	2	12	6	3	0	0
100	2	0	0	2	10	0	3	0	0	3	10	0	4	0	0
125	2	10	0	3	2	6	3	15	0	4	7	6	5	0	0
150	3	0	0	3	15	0	4	10	0	5	5	0	6	0	0
200	4	0	0	5	0	0	6	0	0	7	0	0	8	0	0
250	5	0	0	6	5	0	7	10	0	8	15	0	10	0	0
500	10	0	0	12	10	0	15	0	0	17	10	0	20	0	0
600	12	0	0	15	0	0	18	0	0	21	0	0	24	0	0
700	14	0	0	17	10	0	21	0	0	24	10	0	28	0	0
800	16	0	0	20	0	0	24	0	0	28	0	0	32	0	0
900	18	0	0	22	10	0	27	0	0	31	10	0	36	0	0
1000	20	0	0	25	0	0	30	0	0	35	0	0	40	0	0

Per Cent.

Amount	4½			5			7½			10		
£	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
25	1	2	6	1	5	0	1	17	6	2	10	0
50	2	5	0	2	10	0	3	15	0	5	0	0
75	3	7	6	3	15	0	5	12	6	7	10	0
100	4	10	0	5	0	0	7	10	0	10	0	0
125	5	12	6	6	5	0	9	7	6	12	10	0
150	6	15	0	7	10	0	11	5	0	15	0	0
200	9	0	0	10	0	0	15	0	0	20	0	0
250	11	5	0	12	10	0	18	15	0	25	0	0
500	22	10	0	25	0	0	37	10	0	50	0	0
600	27	0	0	30	0	0	45	0	0	60	0	0
700	31	10	0	35	0	0	52	10	0	70	0	0
800	36	0	0	40	0	0	60	0	0	80	0	0
900	40	10	0	45	0	0	67	10	0	90	0	0
1000	45	0	0	50	0	0	75	0	0	100	0	0

manufacturing cocoa in 1839.

***

2. Table showing the Interest on various amounts, at sundry percentages, for one calendar month.

RULE.—Multiply the amount by the percentage, and the product by the number of months, and divide the new product by 1,200.

Per Cent.

Amount.	2			2½			3			3½			4		
£	£	s.	d.	£	s.	d.	£	s.	d	£	s.	d.	£	s.	d.
25	0	0	10	0	1	0½	0	1	3	0	1	5½	0	1	8
50	0	1	8	0	2	1	0	2	6	0	2	11	0	3	4
75	0	2	6	0	3	1½	0	3	9	0	4	4½	0	5	0
100	0	3	4	0	4	2	0	5	0	0	5	10	0	6	8
125	0	4	2	0	5	2½	0	6	3	0	7	3½	0	8	4
150	0	5	0	0	6	3	0	7	6	0	8	9	0	10	0
200	0	6	8	0	8	4	0	10	0	0	11	8	0	13	4
250	0	8	4	0	10	5	0	12	6	0	14	7	0	16	8
500	0	16	8	1	0	10	1	5	0	1	9	2	1	13	4
600	1	0	0	1	5	0	1	10	0	1	15	0	2	0	0
700	1	3	4	1	9	2	1	15	0	2	0	10	2	6	8
800	1	6	8	1	13	4	2	0	0	2	6	8	2	13	4
900	1	10	0	1	17	6	2	5	0	2	12	6	3	0	0
1000	1	13	4	2	1	8	2	10	0	2	18	4	3	6	8

Per Cent.

Amount.	4½			5			7½			10		
£	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
25	0	1	10½	0	2	1	0	3	1½	0	4	2
50	0	3	9	0	4	2	0	6	3	0	8	4
75	0	5	7½	0	6	3	0	9	4½	0	12	6
100	0	7	6	0	8	4	0	12	6	0	16	8
125	0	9	4½	0	10	5	0	15	7½	1	0	10
150	0	11	3	0	12	6	0	18	9	1	5	0
200	0	15	0	0	16	8	8	5	0	1	13	4
250	0	18	9	1	0	10	1	11	3	2	1	8
500	1	17	6	2	1	8	3	2	6	4	3	4
600	2	5	0	2	10	0	3	15	0	5	0	0
700	2	12	6	2	18	4	4	7	6	5	16	8
800	3	0	0	3	6	8	5	0	0	6	13	4
900	3	7	6	3	15	0	5	12	6	7	10	0
1000	3	15	0	4	3	4	6	5	0	8	6	8

EPPS'S COCOA, Grateful and Comforting.

3. Table showing the Interest on various amounts, at sundry percentages, for one day.

RULE.—Multiply the amount by the percentage, and the product by the number of days, and divide the new product by 36,500.

Per Cent.

Amount.	2	2½	3	3½	4
£	s. d.	s. d.	s. d.	s. d.	s. d.
25	0 0¼	0 0¼	0 0¾	0 0½	0 0½
50	0 0½	0 0¾	0 1½	0 1	0 1¼
75	0 0¾	0 1	0 2¼	0 1½	0 1¾
100	0 1¼	0 1½	0 3	0 2	0 2½
125	0 1½	0 2	0 3¾	0 2¾	0 3¼
150	0 1¾	0 2¼	0 4½	0 3¼	0 3¾
200	0 2½	0 3¼	0 6	0 4½	0 5¼
250	0 3¼	0 4	0 7½	0 5¾	0 6½
500	0 6½	0 8	0 15	0 11½	1 1
600	0 7¾	0 9¾	0 18	1 1¾	1 3¼
700	0 9	0 11½	1 1¼	1 4	1 6¼
800	0 10½	1 1	1 4½	1 6¼	1 9
900	0 11¾	1 2¾	1 5¾	1 8½	1 11½
1000	1 1	1 4¼	1 7½	1 11	2 2¼

Per Cent.

Amount.	4½	5	7	10
£	s. d.	s. d.	s. d.	s. d.
25	0 0½	0 0¾	0 1	0 1½
50	0 1¼	0 1½	0 2¼	0 3¼
75	0 2	0 2¼	0 3½	0 4¾
100	0 2¾	0 3¼	0 4¾	0 6½
125	0 3½	0 4	0 6	0 8
150	0 4¼	0 4¾	0 7¼	0 9¾
200	0 5¾	0 6½	0 9¾	1 1
250	0 7¼	0 8	1 0¼	1 4¼
500	1 2¾	1 4¼	2 0½	2 8¾
600	1 5¾	1 7½	2 5½	3 3¼
700	1 8½	1 11	2 10½	3 10
800	1 11½	2 2¼	3 3¼	4 4½
900	2 2½	2 5½	3 8¼	4 11
1000	2 5½	2 8¾	4 1¼	5 5½

EPPS'S COCOA invigorates and sustains.

ROMAN AND ARABIC NOTATION.

The Romans expressed Numbers by the letters I, V, X, L, C, D, M, which are still employed for dates on buildings, &c. The Arabic symbols, 1, 2, 3, 4, 5, 6, 7, 8, 9, are now used, and, with the aid of 0, all our numbers are formed by them.

Rom.	Arab.	Rom.	Arab.	Rom.	Arab.
I.	1	XX.	20	CCCC.	400
II.	2	XXV.	25	D.	500
III.	3	XXX.	30	DC.	600
IV.	4	XXXV.	35	DCC.	700
V.	5	XL.	40	DCCC.	800
VI.	6	XLV.	45	DCCCC.	900
VII.	7	L.	50	M.	1,000
VIII.	8	LV.	55	MC.	1,100
IX.	9	LX.	60	MCC.	1,200
X.	10	LXV.	65	MCCC.	1,300
XI.	11	LXX.	70	MCCCC.	1,400
XII.	12	LXXV.	75	MD.	1,500
XIII.	13	LXXX.	80	MDC.	1,600
XIV.	14	LXXXV.	85	MDCC.	1,700
XV.	15	XC.	90	MDCCC.	1,800
XVI.	16	XCV.	95	MDCCCC.	1,900
XVII.	17	C.	100	MM.	2,000
XVIII.	18	CC.	200		
XIX.	19	CCC.	300		

A line over any letter increases its value a thousandfold, thus :—

$\overline{V} = 5{,}000$ $\overline{M} = 1{,}000{,}000$

$\overline{D} = 500{,}000$ &c.

SIGNS USED IN MATHEMATICS.

$=$ Equal to, the sign of Equality. $6 + 5 = 11$.

$+$ Plus, the sign of Addition. $6 + 5 = 11$, signifies that 5 added to 6 equals 11.

$-$ Minus, the sign of Subtraction. $6 - 5 = 1$, signifies that 5 taken from 6 equals 1.

EPPS'S contains the maximum

SIGNS USED IN MATHEMATICS—*continued.*

× The sign of **Multiplication.** $6 \times 5 = 30$, signifies that multiplied by 5 equals 30.

÷ The sign of **Division.** $30 \div 5 = 6$, signifies that 30 divided by 5 equals 6. $\frac{30}{5}$ also signifies that 30 is divided by 5.

∴ Signifies **therefore.** ∵ Signifies **because.**

: Signifies **is to** ; :: signifies **so is** and : signifies **to.**

(These are signs to express **Proportion.**)

The expression—As 6 : 9 :: 8 : 12—is read thus :—
As 6 is to 9 so is 8 to 12.

L, *l*, £ Signifies pounds, *L* being the first letter of the Latin word *Libra*, meaning a pound.

S, *s* Signifies shillings, *S* being the first letter of the Latin word *Solidus*, meaning a shilling.

D, *d* Signifies pence, *D* being the first letter of the Latin word *Denarius*, meaning a penny.

¼ Denotes a farthing; a quarter of anything; or 1 divided by 4.

½ Denotes a halfpenny; a half of anything; or 1 divided by 2.

¾ Denotes three farthings; three quarters of anything; or 3 divided by 4.

$\sqrt{}$ is called the Radix, the Latin name for root.

$\sqrt{}$ Signifies the Square Root. $\sqrt{100}$ denotes the square root of $100 = 10$.

$\sqrt[3]{}$ Signifies the Cube Root. $\sqrt[3]{125}$ denotes the cube root of $125 = 5$.

$\sqrt[4]{}$ Signifies the Fourth Root. $\sqrt[4]{16}$ denotes the fourth root of $16 = 2$.

a^2 Called a squared $= a \times a$.

a^3 Called a cubed $= a \times a \times a$.

a^4 Called a to the fourth power $= a \times a \times a \times a$.

SIGNS USED IN MATHEMATICS—*continued.*

⊥ Indicates perpendicular to.
∥ Indicates parallel to.
⧸ Indicates oblique to.
∠ Indicates an acute angle.
∟ Indicates a right angle.
∠ Indicates an obtuse angle.
△ Indicates a triangle.
□ Indicates a square.
▭ Indicates a parallelogram.
○ Indicates a circle.
° Indicates degree, as 50° stands for 50 degrees.
′ Indicates minutes, as 50° 10′ means 50 degrees 10 minutes.
″ Indicates seconds, as 50° 10′ 20″ means 50 degrees 10 minutes 20 seconds.
′ Also indicates feet, and ″ inches. Thus, 5′ 6″ means 5 feet 6 inches.

ARITHMETICAL TERMS.

Sum = The answer of an Addition sum.
Difference = The answer of a Subtraction sum.
Product = The answer of a Multiplication sum.
Quotient = The answer of a Division sum.
Multiplicand = The number to be multiplied.
Dividend = The number to be divided.
Multiplier = The number that multiplies.
Divisor = The number that divides.
Measure = The number which will exactly divide another number.
G. C. M. = Greatest Common Measure, is the greatest number which will exactly divide any two or more numbers.
Factors = Are numbers which, when multiplied together, make up another number.
Multiple = The number which contains another an exact number of times.
L. C. M. = The least number which contains two or more numbers an exact number of times.

EPPS'S COCOA, Grateful and Comforting.

COINS IN USE.

Gold—

Sovereign or pound = £1 or 20s.
Half-sovereign ..... = 10s.

Silver—

Crown..... = 5s.
Double-Florin ..... = 4s.
Half-crown ..... = 2s. 6d.
Florin..... = 2s
Shilling ..... = 1s.
Sixpence ..... = 6d.
Three-pence ... = 3d.

Bronze—

Penny..... = 1d.
Half-penny ... = ½d.
Farthing..... = ¼d.

One lb. Troy of standard gold (22 parts pure gold to 2 parts alloy) is coined into 46 2/10 sovereigns.

One lb. Troy of standard silver (37 parts pure silver to 3 parts alloy) is coined into 66 shillings.

One pound Avoirdupois of bronze is coined into 48 pennies.

OTHER COINS FORMERLY USED.

Gold	Guinea	= 21s.
	Half-guinea	= 10s. 6d.
	Mark	= 13s. 4d.
	Angel	= 10s. 0d.
	Noble	= 6s 8d.
Silver	Tester	= 0s 6d.
	Groat	= 0s. 4d.

PROPOSED DECIMAL COINAGE.

1 mil ..... = £·001 = 2/5d.
10 mils = 1 cent ..... = £·01 = 2·4d.
100 mils = 10 cents = 1 florin = £·1 = 2s.
1,000 mils = 100 cents = 10 florins = £1.

EPPS'S is the choicest of all cocoas.

FOREIGN MONEY AND ENGLISH VALUES.

Subject to varying rates of exchange.

			s.	d.
ARGENTINE REPUBLIC.				
100	Centavos = 1 Peso (silver) or dollar	=	3	11½
5	Peso piece (gold)	=	19	10
AUSTRIA AND HUNGARY.				
100	Kreutzers or Heller = 1 Krone	=	0	10
10	Kronen	=	8	4
24	Kronen	=	20	0
BELGIUM.				
100	Centimes = 1 Franc	=	0	9½
5	Francs	=	3	11½
20	Francs	=	15	10
25	Francs	=	20	0
BRAZIL.				
1,000	Reis = 1 Milrei (par value)	=	2	2½
10	Milreis	=	22	1
	Actual value of Milreis, 1901, about 8d.			
BULGARIA.				
10	Stotinkis = 1 Leva	=	0	9½
10	Leva piece	=	7	11
CHILE.				
100	Centavos = 1 Peso	=	1	6
CHINA.				
1,600	Cash = 1 Haekwan Tael	=	3	1¼
DENMARK.				
100	Ore = 1 Krone	=	1	1¼
10	Kroners or Crown pieces	=	11	1½
EGYPT.				
1	Piastre	=	0	2½
100	Piastres or £ Egyptian	=	20	3½
FINLAND.				
100	Penni = 1 Markka	=	0	9½
10	Markka piece	=	7	11½
FRANCE.				
100	Centimes = 1 Franc	=	0	9½
5	Franc piece	=	3	11½
10	Franc piece	=	7	11½
1	Napoleon	=	15	10
25	Francs	=	20	0

EPPS'S Milk Chocolate melts in th

FOREIGN MONEY & ENGLISH VALUES—*continued.*

Subject to varying rates of exchange.

			s.	d.
GERMANY.				
100	Pfennige = 1 Mark	=	0	11¾
3	Marks = 1 Thaler	=	2	11
1	Crown	=	9	9½
20	Mark piece	=	19	7
20	Mark, 40 Pfennige	=	20	0
GREECE.				
100	Lepta = 1 Drachmai (par value)	=	0	9½
5	Drachmai piece	=	3	11½
10	Drachmai piece	=	7	11
20	Drachmai piece	=	15	10
	Present rate 39 Dr. = 20s.			
HOLLAND.				
5	Cents = 1 Stiver	=	0	1
100	Cents = 1 Guilder or Florin	=	1	8
1	Ducat	=	9	4½
10	Guilder piece	=	16	6½
12	Guilders	=	20	0
INDIA.				
4	Pice = 1 Anna	=	0	1
16	Annas = 1 Rupee	=	1	4
15	Rupees	=	20	0
	100,000 R. = a Lac. 10,000,000 R. = a Crore.			
ITALY.				
100	Centesimi = 1 Lira	=	0	9½
25	Lire	=	20	0
JAPAN.				
10	Rin = 1 Sen	=	0	0¼
100	Sen = 1 Yen or Dollar	=	2	0⅛
MEXICO.				
100	Centavos = 1 Peso (silver Dollar)	=	2	0
	The Peso is nominally worth 4s.			
NORWAY & SWEDEN.				
100	Ore = 1 Kroner	=	0	1
18⅛	Kroners or Crowns	=	0	20

mouth with a delightful smoothness.

FOREIGN MONEY & ENGLISH VALUES—*continued.*

Subject to varying rates of exchange.

			s.	d.
PERSIA.				
20	Shahis = 1 Kran	=	0	4¾
10	Krans = 1 Toman (silver)	=	9	5
50	Krans	=	20	0
PERU.				
100	Centavos = 1 Sol	=	2	0
10	Soles = 1 Libra	=	20	0
PORTUGAL.				
100	Reis = 1 Teston	=	0	5¼
10	Testons = 1 Milrei	=	4	5¼
10	Milreis or Gold Crowns	=	44	4½
4,500	Reis	=	20	0
RUSSIA.				
100	Kopecks = 1 Rouble	=	2	1½
9½	Roubles	=	20	0
ROUMANIA.				
10	Bani	=	0	1
100	Bani = 1 Lei	=	0	9½
SERBIA.				
100	Paras = 1 Dinar	=	0	9½
10	Dinar piece	=	7	11
SPAIN.				
100	Centisimos = 1 Peseta	=	0	9½
25¼	Pesetas	=	20	0
SWITZERLAND.				
100	Centimes = 1 Franc	=	0	9½
10	Franc piece	=	7	11¼
TURKEY.				
40	Paras = 1 Piastre	=	0	2
100	Piastres = 1 Pound (Turkish Lira)	=	18	0¾
UNITED STATES.				
10	Cents = 1 Dime	=	0	5
100	Cents = 1 Dollar	=	4	2
10	Dollars = 1 Eagle	=	41	1½
4	Dollars 86½ Cents	=	20	0

EPPS'S COCOA, Grateful and Comforting

MEASURES OF HEAT.

The temperature of things is measured by an instrument called the *Thermometer*, of which there are three kinds:—

(1) **Centigrade Thermometer.**—Freezing point marked 0°, and boiling point 100°.

(2) **Reaumur's Thermometer.**—Freezing point marked 0°, and boiling point 80°.

(3) **Fahrenheit's Thermometer.**—Freezing point marked 32°, and boiling point 212°.

COMPARISON OF SCALES.

Fahrenheit.	Centigrade.	Reaumur.
*212	*100	*80
200	93·6	74·6
180	82·2	65·7
160	71·1	56·8
140	60	48
120	48·8	39·1
100	37·8	30·2
90	32·2	25·7
80	26·6	21·3
70	21	16·8
60	15·5	12·4
50	10	8
40	4·4	3·5
†32	†0	†0

* Boiling point. † Freezing point.

The Centigrade Thermometer is most widely used, but in England, N. America, etc., Fahrenheit's is used for general purposes; in Germany, Reaumur's. For strictly scientific purposes the Centigrade is now universally used.

Monarch Cocoa the cocoa for all times.

FREEZING AND BOILING POINTS.

Substances.	Fahr.	Cent.	Reaum.
Olive Oil freezes at...	50	10	8
Rose Oil freezes at...	60	15·5	12·4
Water freezes at	32	0	0
Alcohol boils at	173·1	74·4	59·5
Quicksilver boils at...	680	360	283
Water boils at.....	212	100	80

THE MARINER'S COMPASS.

North, South, East and West are terms used to express the relative positions of places to one another. They are the four **Cardinal Points** of the compass—an instrument used to determine the respective bearings of places. There are altogether thirty-two points of the compass—twenty-eight of the number

EPPS'S Sola Chocolate leaves

being intermediate between the four cardinal points. The point lying midway between north and east is called *North-East;* that midway between north and west *North-West.* In like manner the points lying midway between the east and west and the south points are called *South-East and South-West.*

These points are sometimes called the four Collateral Points.

Giving a bearing, or laying a course by "degrees" has recently become more generally adopted.

The circumference of the Compass being divided into 360 divisions or degrees, "East" becomes 90°, "South" 180°, "West" 270° and so on.

The Compass does not point due North (*i.e.*, to the North Pole) but to the North Magnetic Pole, thus causing "Variation" at most places on the globe.

At London (1919) this variation is approximately 15° West.

TABLE OF THE PLANETS.

Names.	Distance from the Sun.	Length of diameter.	Time in going round the Sun.
	Miles.	Miles.	Days.
Mercury	35,392,000	3,030	88
Venus	66,131,500	7,700	225
Earth	91,430,200	7,913	365¼
Mars	139,312,200	4,230	687
Jupiter	475,693,100	86,390	4.333
Saturn	872,134,600	71,900	10.759
Uranus	1,753,851,000	31,900	30.687
Neptune	2,746,271,200	32,900	60,127

GENERAL INFORMATION.

Weight of 1 cubic foot.

Fresh Water	62½ lbs.	Gravel	110 lbs.
Sea Water	63½ ,,	Ballast	130 ,,
Oak ..	58 ,,	Stone	140 ,,
Soft Woods	about 40 ,,	Aluminium	162 ,,
Coal ..	80 ,,	Iron ..	485 ,,
Clay ..	125 ,,	Lead ..	709 ,,

A Sack of

Coal .. weighs	2 cwts.
Flour	2½ ,,
Potatoes ..	1½ ,,
Sugar (Continental) weighs	2 ,,

a lingering delicacy of flavour.

COMPARATIVE WEIGHT OF VARIOUS SUBSTANCES.

Substance.	Weight of one cubic foot in ounces (avoirdupois)	Substance.	Weight of one cubic foot in ounces. (avoirdupois)
Cork	240	Mahogany	1060
Poplar	380	Saturated Brine ..	1200
Fir	550	Lignum Vitæ	1220
Elm	580	Coal	1300
Cedar..	610	Ebony	1250
Red Pine	660	Opium	1340
Pear	660	Honey	1450
Walnut	670	Ivory	1830
Cherry	720	Clay	2000
Maple	750	Sulphur	2030
Alcohol	790	Marble	2700
Ash (tree)	840	Granite..	2780
Beech	850	Chalk	2790
Human Body (alive) ..	890	Glass	2890
Ice	920	Diamond	3530
Gunpowder..	930	Zinc	7000
English Oak	934	Cast Iron	7250
Butter	940	Tin	7300
Turpentine	990	Bar Iron	7790
Fresh Water	1000	Steel	7830
Wine	1000	Brass	8400
Green Heart	1000	Copper	8890
Cider	1020	Silver	10,740
Beer	1020	Lead	11,350
Sea Water	1030	Mercury	13,570
Cow's Milk	1030	Gold	19,260
Goat's Milk	1040	Platinum	20,980
Porter	1040		

STANDARD TIME.

For the purpose of Synchronising Clocks and to ensure the running of trains etc. to a scheduled time, zones of "Standard Time" have been established in various parts of the world.

There are three in Europe—Greenwich, Mid-Europe and East-Europe, and five in North America viz, Atlantic or Inter-Colonial, Eastern Central, Mountain, Pacific and Alaskan. Within each of these zones all clocks show the same time—the true time variations (1 minute for every 10 miles) being disregarded.

As a traveller progresses Westward, however, and enters another zone a difference of time of one hour is made, 4 o'clock becomes 3 o'clock, while travelling Eastward the process is reversed, 4 o'clock becoming 5 o'clock and so on.

"Standard Time" has been adopted by countries in other parts of the world over zones of their own selection, but the above are the best known instances and the most important commercially.

EPPS'S COCOA, Grateful and Comforting.

TO FIND LONGITUDE BY TIME.

The Earth makes a journey through 360 degrees in every 24 hours, which gives 15° in one hour. All time in England is regulated by Greenwich time, and 12 o' clock at noon at Greenwich is the standard by which all English time is arranged. A person travelling from England to a place 15° E. would find that the clocks and watches there were all registering 1 o' clock p.m., while it was only 12 o' clock by his watch, and that his watch was an hour slow. If he travelled 15° W. he would find that his watch was fast and that while it was 12 o' clock by his watch, the time of the day there would be only 11 o' clock. By allowing an hour of time for every 15° passed over, it is possible to ascertain the correct time at any place in the world.

SUMMER TIME (DAYLIGHT SAVING).

During the Summer of 1916 several European nations adopted a simple method of securing a longer period of daylight hours for work and recreation by enacting that all clocks should be put *forward* one hour on April 1st, and *back* again one hour on September 30th. What, according to old reckoning, used to be called 7 a.m., thus became 8 a.m., and the hours of evening daylight were correspondingly lengthened, the old hour of 9 p.m. becoming 10 p.m.; or to put it another way, it was not dark until one hour later (by the clock).

This change had been advocated for many years by the late Mr. William Willett in spite of much opposition and ridicule.

Mr. Willett's genius was proved by the way in which country after country adopted his scheme.

Since 1916, the dates when Summer-time has commenced and ended have varied slightly in different years and different countries.

GEOMETRICAL TABLE.

FOR CIRCULAR AND ANGULAR MEASURING.

60 Seconds (″)	.....	1 Minute (′).
60 Minutes	.....	1 Degree(°).
30 Degrees	.....	1 Sign.
60 Degrees	.....	1 Sextant.
90 Degrees	.....	1 Quadrant.
360 Degrees	.....	1 Circle or Circumference.

Monarch Cocoa is pure and soluble.

RELATIVE SOLAR TIME AT PLACES WHEN IT IS NOON AT GREENWICH.

1. OF PLACES EAST OF GREENWICH.

Places.	Time when it is noon at Greenwich.	Longitude.
	H. M.	°
Adelaide	9 14 P.M.	138½
Aden	3 0 ,,	45
Alexandria..	1 59 ,,	30
Amsterdam	12 19 ,,	4¾
Berlin	12 54 ,,	13½
Berne	12 30 ,,	7½
Bombay	4 51 ,,	73
Cairo..	2 5 ,,	31
Calcutta	5 53 ,,	88
Cape Town	1 12 ,,	18
Constantinople	1 56 ,,	29
Durban	2 2 ,,	30½
Florence	12 44 ,,	11
Geneva	12 24 ,,	6
Hamburg	12 39 ,,	10
Johannesberg	1 56 ,,	29
Khartum	2 9 ,,	32½
Lyons	12 19 ,,	4¾
Malta	12 58 ,,	14½
Melbourne	9 40 ,,	145
Moscow	2 30 ,,	37½
Naples	12 57 ,,	14
Odessa	2 2 ,,	30½
Paris	12 10 ,,	2½
Pekin	7 46 ,,	116½
Petrograd	2 1 ,,	30
Pretoria	1 54 ,,	28½
Rome	12 49 ,,	12¼
Sydney	10 5 ,,	151
Trieste	12 56 ,,	14
Vienna	1 6 ,,	16½
Zanzibar	2 37 ,,	39

Nerve, strength and energy are the

2. OF PLACES WEST OF GREENWICH.

Places.	Time when it is noon at Greenwich.	Longitude.
	H. M.	°
Albany (N.Y.)	7 4 A.M.	74
Baltimore	6 54 ,,	76
Boston	7 16 ,,	70½
Buenos Ayres	8 8 ,,	58
Callao	6 48 ,,	78
Chicago	6 8 ,,	88
Dublin	11 35 ,,	6¼
Edinburgh	11 47 ,,	3¼
Fredericktown	7 36 ,,	66½
Gibraltar	11 39 ,,	5¼
Glasgow	11 43 ,,	4¼
Havana	6 31 ,,	82
Lisbon	11 23 ,,	9¼
Madrid	11 45 ,,	3¾
Monte Video	8 16 ,,	56
Montreal	7 4 ,,	74
New Orleans	6 0 ,,	90
New York	7 4 ,,	74
Ottawa	6 56 ,,	76
Pernambuco	9 40 ,,	35
Philadelphia	7 0 ,,	75
Quebec	7 15 ,,	71
Rio de Janeiro	9 8 ,,	43
San Francisco	3 52 ,,	122
St. John (N.B.)	7 36 ,,	66
Toronto	6 44 ,,	79
Trinidad	7 54 ,,	61½
Valparaiso	7 16 ,,	71
Washington	6 52 ,,	77
Winnipeg	5 32 ,,	97

esults of drinking "EPPS'S."

LENGTH OF THE LONGEST & SHORTEST DAY IN DIFFERENT LATITUDES.

Latitude.	Longest.	Shortest.
	Hrs. mins.	Hrs. mins.
0°	12 0	12 0
15°	12 53	11 7
30°	13 56	10 4
45°	15 26	8 34
*51½°	16 15	7 45
60°	18 30	5 30
66½° (Arctic Circle).	24 0	0 0
	Longest day in Northern Hemisphere	Longest day in Southern Hemisphere
70°	65 days.	60 days.
80°	134 days.	127 days.
90°	186 days.	179 days.

* Latitude of London.

LENGTH OF DEGREES OF LATITUDE AND LONGITUDE.

Latitude.	Length of a Degree on a Meridian.	Length of a Degree on a Parallel.
	Feet.	Feet
0°	362,644	365,185
10°	362,850	359,677
20°	363,175	343,292
30°	363,660	316,532
40°	364,523	280,131
50°	364,886	235,195
60°	365,482	183,099
70°	365,788	125,270
80°	366,300	63,619
90°	366,489	0

EPPS'S COCOA, Grateful and Comforting.

PIONEER DISCOVERIES & INVENTIONS.

250 B.C. Screw invented (Archimedes); also principle of specific gravity and of levers.

1250 A.D. Reference in *Stowe's Chronicles* to growing use of coal as fuel.

1269. Mariner's Compass invented in Europe (long known in China).

1439. First printing processes (Gutenberg).

1492. West Indian Islands discovered by Columbus.

1543. Motion of earth and planets round the sun, not *vice versa*. (Copernicus).

1583-1608. Galileo discovered the principle of the pendulum, and invented the first (air) thermometer, microscope, and astronomical telescope (opera glass).

1600. First experiments on frictional electricity (Dr. Gilbert, physician to Queen Elizabeth).

1609. Laws of motion of the Planets (Kepler).

1620. *The Mayflower*, with the Pilgrim Fathers, sailed for Massachusetts.

1628. Circulation of the blood discovered (Dr. Harvey).

1643. Barometer invented (Torricelli).

1659. Mercury thermometer invented; improved by Fahrenheit, 1714.

1676. Spectrum discovered (Sir Isaac Newton).

1686. Laws of Motion and Theory of Gravitation (Sir Isaac Newton).

1758. Achromatic lenses invented (Dollond).

1764. Oxygen discovered (Joseph Priestley).

1767-70. Inventions in spinning machinery (Hargreaves, Arkwright, etc.).

1768-71. Captain Cook's Voyage Round the World.

1770. The first condensing steam engine (James Watt).

1782. The first balloon (Montgolfier).

1787. Volta discovered current electricity.

1799. Vaccination introduced (Dr. Jenner).

1800. Electric arc discovered (Sir Humphry Davy).

1800. Deposition of pure copper by electric current (Cruickshanks).

1802. Coal gas used as illuminant (Murdoch).

1808. Bell's *Comet*, steamship on the Clyde.

1814. George Stephenson's first locomotive.

1815. Sir Humphry Davy invented miner's safety lamp.

1818. Macadam's improved system of roadmaking.

1819. First attempts at photography (Niépce).

1819. Steamship *Savannah* crossed Atlantic.

1820. Electro-magnets (Sir Humphry Davy).

1825. Stockton and Darlington Railway opened.

1831. Magneto electric-induction discovered by Michael Faraday, whose magneto-electric machine was the forerunner of all dynamoes.

EPPS'S Sola Chocolate has a refined vanilla flavour.

PIONEER DISCOVERIES AND INVENTIONS—*continued.*

1831. First electric motor (Henry).
1837. Wheatstone's Telegraph adopted by L.N.W. Railway.
1839. Penny Postage introduced.
1839. Epps's Cocoa manufacture started
1840. Commercial electroplating (Elkington).
1847. Use of anæsthetics discovered (Sir James Simpson).
1850. Electric bell invented.
1856. First aniline dye (Dr. William Perkin).
1856. Sir Henry Bessemer's process for mild steel.
1858. First Atlantic Cable laid.
1859. Charles Darwin published "The Origin of Species."
1860. Electric accumulator invented (Planté).
1866-70. Pasteur's researches on wine, vinegar, diseases of grape vines and silkworms; bacteria discovered.
1868. Dynamite for blasting (Nobel).
1869. Suez Canal opened.
1876. Prof. Bell's Telephone.
1877. Edison's Phonograph.
1879. Electric lamp, carbon filament in vacuum (Swan).
1883. First electric tramway (Portrush Railway).
1885. Early forms of safety bicycle introduced (Starley, Coventry.
1885. Pasteur discovered a cure for hydrophobia.
1882-8. First experiments on wireless electric waves (Preece, Herz).
1891. First petrol motor car (Daimler).
1894. First public wireless transmission of signals (Sir Oliver Lodge).
1895. Röntgen, using a "Crookes' tube," discovered the "X-rays."
1898. Imperial Penny Postage (lapsed during the war).
1898. Metallic filament electric lamps (Welsbach).
1899. Improvements in long-distance wireless transmission (Marconi).
1900. Radium (Madame Curie).
1909. Aeroplane flew across English Channel (Bleriot).
1910. Commander Peary reached North Pole.
1911-12. Amundsen Expedition and Scott Expedition reached South Pole.
1915. Wireless Telephony.

May 18, 1919, Hawker and Grieve attempted to fly the Atlantic, from St. Johns, Newfoundland, to Ireland, but were unsuccessful.

May 16-31, 1919 the N.C. 4, an American seaplane, successfully crossed the Atlantic from Newfoundland to Plymouth, *via* the Azores and Lisbon.

June 14-15, 1919, Alcock (pilot) and Brown (navigator) successfully crossed the Atlantic, flying a Vickers'-Vimy-Rolls-Royce twin-engine aeroplane from St. John's, Newfoundland, to Clifden, Ireland, accomplishing the coast-to-coast flight of 1880 miles over the sea in 15 hrs. 57 mins.

Nov. 12—Dec. 10, 1919, Capt. Ross-Smith flew from England to Australia *via* Cairo, Delhi, and Singapore, distance 11,000 miles.

EPPS'S COCOA for breakfast give

THE PROGRESS OF AVIATION.

In 1843 Henson invented a rather elaborate Flying Machine, but Lilienthal was the first successful experimenter on short flights. Santos-Dumont, Delagrange, the Bros. Wright and Bleriot made successful short flights; the latter, in April 1907, attaining a speed of 30 miles per hour. In January 1908, a 50,000fr. prize for a kilometre flight was won by Maurice Farman (1 min. 28 secs). A Channel flight by Bleriot in 37 mins., who flew from Calais to Dover, was made on July 25th, 1909. On April 28th, 1910, Paulhan flew from London to Manchester, being the winner of a competition flight. A flight of 1010 miles round Great Britain was carried out by Lieut. Conneau (Beaumont), a Frenchman, on July 22nd, 1911 (22½ hours). The first successful Atlantic Flight by Airship was that of the British R 34 from East Fortune (Scotland) to New York, a distance of 3130 sea-miles, in 108 hours, during July of 1919; the return journey, under more favourable conditions, being completed in 75 hours (see also p. 44).

THE ORIGIN OF THE "SAFETY" BICYCLE.

J. K. Starley of Coventry, in 1885, practically made the first cycle in its form as known to-day, superseding the old high type, in distinction from which it was termed the "Safety."

WIRELESS TELEGRAPHY & TELEPHONY.

The directing of electric currents without wires has occupied electricians' attention since 1831. In 1882 Sir William Preece in experimenting used Morse's method to connect the Isle of Wight with the Mainland during the failure of the submarine cable, and in 1892 established communication between two points in the Bristol Channel and at Lochness in Scotland.

Marconi's investigations in 1895 led to the installation of wireless systems on ships, and coastal stations in 1900. Signals were received by Marconi at St. Johns, Newfoundland, from Cornwall on Dec. 12th, 1901, a distance of 1800 miles.

Experiments in Wireless Telegraphy and Telephony are still being made, the latter being rapidly developed at the present time.

THE MOTOR CAR AND ITS INCEPTION.

Cugnot, a Frenchman, invented the first steam carriage in 1769, the first petrol motor, a Daimler, being run from Paris to Brest in 1891. During 1905-6 omnibuses of more reliable manufacture appeared in the streets of London and other large towns. Since those days remarkable progress has been made in all types of motor vehicles.

nergy and zest for the day's labours.

THE RAILWAYS OF THE WORLD.

Country	Mileage	Country	Mileage
United States	265,218	Chile	5,015
Russia (in Europe and Asia)	48,955	Turkey (in Europe and Asia)	4,576
Germany	39,600	Egypt and the Sudan	4,381
India	35,833	Switzerland	3,571
Canada	35,582	Algeria and Tunis	3,200
Austria and Hungary	29,328	New Zealand	2,969
France	31,958	Rhodesia	2,481
United Kingdom	23,701	Denmark	2,455
Argentina	22,688	Rumania	2,382
Australia	22,238	Holland	2,320
Mexico	16,088	French Indo-China	2,200
Brazil	16,294	Norway	1,967
Italy	11,635	Portugal	1,849
Spain	9,377	Dutch East Indies	1,721
Sweden	9,288	Cuba	1,690
Union of South Africa	8,986	Peru	1,656
Japan	7,131	Uruguay	1,524
China	6,467	British W. Africa	1,463
Belgium	5,451		

Approximate total World Mileage 650,000, of which 134,200 miles are within the British Empire.

THE WORLD'S GREATEST BRIDGES.

Name of Bridge	Where Situate	Length in feet
Tay	Scotland	10,780
Ohio	United States	10,560
Victoria	Montreal	9,144
Forth	Scotland	8,296
Missouri	United States	7,632
Queensborough	New York	7,500
Williamsburgh	New York	7,308
Manhattan	New York	6,840
Susquehanna	United States	6,315
Brooklyn	New York	5,989
Cernavoda	Danube	2,350
Memphis	United States	1,886
Grumlin Viaduct	Monmouth	1,800
Boyne Viaduct	Ireland	1,760
Menai (Suspension)	Wales	1,710
Menai (Britannia Tabular)	Wales	1,510
High-level	Newcastle-on-Tyne	1,380
Charing Cross	London	1,365
Sukkur	India	1,250
Tower	London	800
Clifton Suspension	Clifton	702
Victoria Falls*	Zambesi River	650

*400 feet above water-level; the highest in the World.

EPPS'S COCOA, Grateful and Comforting.

LENGTH OF THE PRINCIPAL RIVERS OF THE WORLD.

Name.	Length in miles.	Name.	Length in miles.
EUROPE.		**AFRICA.**	
Volga	2,300	Nile	3,680
Danube	1,720	Congo	2,880
Don	1,120	Niger	2,585
Dnieper	1,120	Zambesi	1,650
Dwina	1,010	Orange	1,155
Rhine	805	Limpopo	995
Elbe	720	Senegal	890
Rhone	503	**AMERICA.**	
Thames	215	Mississippi	4,060
ASIA.		Amazon	3,550
Yenisei	2,950	St. Lawrence	2,370
Amur	2,920	La Plata	2,230
Yangtse	2,850	Mackenzie	2,200
Obi	2,700	Rio Grande	1,740
Hoang-ho	2,580	Orinoco	1,380
Lena	2,490	Columdia	1,240
Indus	1,975	Colorado	1,240
Ganges	1,680	**AUSTRALIA.**	
Euphrates	1,620	Murray	1,559

PRINCIPAL TUNNELS OF THE WORLD.

Name	Country.	Length in miles.
Andes (Trans-Andine)	Argentina to Chile	5
Arlberg	Austria	6¾
Gunnison	Colorado, U.S.A.	6
Lötschen	Switzerland	9½
Mont Cenis	France to Italy	8
Otira	New Zealand	5½
St. Gothard	Switzerland	9½
Severn	Gloucester, Eng.	4½
Simplon	Switzerland	12½
Totley	Derbyshire, Eng.	3¾
Woodhead	Yorkshire, Eng.	3
Blackwall	London, Eng.	1¼
Mersey	Liverpool, Eng.	1¼
Thames (Rotherhithe)	London, Eng.	1

EPPS'S Chocolates in endless variety.

PRINCIPAL LAKES AND MOUNTAINS IN THE WORLD.

Lakes.		Mountains.	
EUROPE.	Area in sq. miles.		Height of highest peak in feet.
Ladoga	6,960	Alps (Mt. Blanc)	15,780
Onega	3,290	Sierra Nevada	11,420
Wener	2 410	Pyrenees	11,170
Peipus	1,355	Balkans	10,010
Wetter	760	Apennines	9,580
Geneva	224	Carpathians	8,740
Constance	208	Scandinavian Alps	8,400
Neagh	152	Auvergne	6,190
Lomond	26	Urals	5,430
Windermere	6	Grampians (B. Nevis)	4,406
ASIA.			
Caspian	165,520	Himalayas (Everest)	29,002
Aral	26.165	Pamir Plateau	25,000
Baikal	13.490	Tien Shan	24,000
Balkash	7,960	Kwenlun	22,380
Issik-kul	2,000	Hindu Kush	18,870
Urmia	1,480	Elburz	18,500
Kuku-nor	1,460	Mts. of Armenia	16,920
Van	1,420	Taurus	12,500
Dead Sea	353	Altai	11,000
AFRICA.			
Victoria	26,350	Kilimanjaro	19,700
Tanganyika	13,550	Kenia	17,200
Tsad	10.430	Ruwenzori	17,000
Nyasa	10,230	Abyssinian Highlands	15,200
Rudolf	3,960	Atlas	14,150
Albert	1,740	Drakensberg	11,000
Albert Edward	1,505		

A cup of EPPS'S at supper tim

PRINCIPAL LAKES AND MOUNTAINS IN THE WORLD—*continued.*

Lakes.		Mountains.	
AMERICA.	Area in sq. miles.		Height of highest peak in feet.
Superior	31,200	Andes (Aconagua)	23,081
Michigan	22,450	Rocky Mts. (Logan)	19,515
Huron	23,800	,, (St. Elias)	18,020
Great Bear	11.200	Mexican Mts.	17,880
Great Slave	10,000	Sa Nevada	16,700
Erie	9,950	Cascade Mts.	14,440
Winnipeg	9,270	Rocky Mts.(Long'sPk)	14,270
Ontario	7,240	Alleghanies	6,707
AUSTRALIA.		**AUSTRALASIA.**	
Eyre	3,670	Hawaii Mts.	13,953
Gairdner	3 100	New Zealand Alps	12,348
Torrens	2 320	Australian Alps	7,340

COUNTIES OF ENGLAND.

Counties.	Area.	Population. 1911.
NORTHERN.	Sq. miles.	Thousands.
Northumberland	2,015	696
Durham	1,011	1,369
Yorkshire	6,067	3,896
Cumberland	1,515	267
Westmorland	782	64
Lancashire	1,887	4,768

promotes a peaceful slumber.

Counties.	Area.	Population. (1911).
WESTERN.	Sq. Miles.	Thousands.
Cheshire	1,026	954
Shropshire	1,342	246
Herefordshire	839	114
Monmouthshire	533	396
Gloucestershire	1,243	736
Somersetshire	1,630	458
EASTERN.		
Lincolnshire	2,646	564
Cambridgeshire	858	198
Norfolk	2,044	499
Suffolk	1,488	394
Essex	1,542	1,350
SOUTHERN.		
London	118	4,536
Kent	1,555	1,046
Surrey	758	846
Sussex	1,458	688
Berkshire	722	281
Hampshire	1,621	950
Wiltshire	1,375	287
Dorsetshire	987	223
Devonshire	2,604	699
Cornwall	1,357	328
MIDLAND.		
Staffordshire	1,171	1,279
Derbyshire	1,029	683
Nottinghamshire	843	604
Leicestershire	823	476
Warwickshire	902	1,247
Worcestershire	750	387
Oxfordshire	755	189
Buckinghamshire	743	219
Middlesex	283	1,126
Hertfordshire	633	311
Bedfordshire	466	195
Huntingdonshire	365	55
Northamptonshire	1,003	348
Rutlandshire	152	21

EPPS'S COCOA, Grateful and Comforting.

COUNTIES OF WALES.

Counties.	Area.	Population (1911)
N. WALES.	Sq. Miles.	Thousands.
Anglesey	274	51
Carnarvon	564	125
Denbigh	691	145
Flintshire	256	92
Merioneth	668	45
Montgomery	797	53
S. WALES.		
Cardigan	688	60
Radnor	470	23
Brecknock	742	59
Carmarthen	918	160
Pembroke	617	89
Glamorgan	807	1,121

COUNTIES OF SCOTLAND.

	Sq. Miles.	Thousands.
1. NORTHERN.		
Shetland Isles	551	28
Orkneys	376	26
Caithness	686	32
Sutherland	2,028	20
2. NORTH-WESTERN.		
Ross and Cromarty	3,089	77
Inverness	4,211	87
3. NORTH-EASTERN.		
Nairn	162	9
Elgin	476	43
Banff	630	61
Aberdeen	1,972	312
Kincardine	381	41
4. EAST-MIDLAND.		
Forfar	874	281
Perth	2,494	124
Fife	504	268
Kinross	82	8
Clackmannan	55	31
5. WEST-MIDLAND.		
Stirling	451	161
Dumbarton	246	140
Argyll	3,110	71
Isle of Bute	218	18
6. SOUTH-WESTERN.		
Renfrew	240	315
Ayr	1,132	268
Lanark	879	1,447

EPPS'S COCOA nourishes and sustains.

Counties.	Area.	Population (1911).
7. SOUTH-EASTERN.	Sq. Miles.	Thousands.
Linlithgow	120	70
Edinburgh	366	508
Haddington	267	43
Berwick	457	30
Peebles	348	15
Selkirk	267	25
8. SOUTHERN.		
Roxburgh	666	47
Dumfries	1,072	73
Kirkcudbright	899	38
Wigtown	487	32

COUNTIES OF IRELAND.

LEINSTER.—Carlow County	349	36
Dublin County	354	477
Kildare County	654	66
Kilkenny County	800	75
King's County	772	57
Longford County	421	44
Louth County	316	63
Meath County	906	65
Queen's County	664	54
Westmeath County	708	60
Wexford County	901	102
Wicklow County	781	61
MUNSTER.—Clare County	1,332	104
Cork County	2,890	391
Kerry County	1,859	159
Limerick County	1,064	143
Tipperary County	1,659	152
Waterford County	717	84
ULSTER.—Antrim County.	1,237	479
Armagh County	512	120
Cavan County	741	91
Donegal County	1,870	168
Down County	957	305
Fermanagh County	715	62
Londonderry County	816	141
Monaghan County	500	71
Tyrone County	1,260	142
CONNAUGHT—Galway County	2,372	182
Leitrim County	619	64
Mayo County	2,156	192
Roscommon County	991	94
Sligo County	707	79

Monarch Cocoa is unsurpassed

THE HUNDRED LARGEST CITIES OF THE WORLD.

(Population in thousands according to latest estimates.)

London (Greater)	7,251	Melbourne	651	Turin	445
New York	5,333	Foochow	650	Kioto	442
London (County)	4,536	Montreal	650	Los Angeles	438
Paris	2,888	Milan	645	Lisbon	435
Chicago	2,393	Cleveland (U.S.A.)	639	Milwaukee	417
Tokio	2,186	Bangkok	628	Frankfurt	415
Vienna	2,149	Odessa	620	Lodz	415
Berlin	2,071	Cheng-tu	600	Dublin	403
Petrograd	2,073	Chung-King	600	Cincinnati	402
Moscow	1,779	Amsterdam	595	Ning-po	400
Philadelphia	1,657	Munich	595	Yokohama	394
Buenos Aires	1,584	Kief	594	Newark (U.S.A.)	389
Canton	1,250	Leipzig	590	Belfast	386
Osaka	1,227	Baltimore	579	Stockholm	382
Calcutta	1,222	Rome	576	Santiago	378
Rio de Janeiro	1,130	Pittsburg	564	Nagoya	378
Glasgow	1,055	Barcelona	560	Kobe	378
Constantinople	1,000	Madrid	560	Toronto	376
Siang-tang	1,000	Copenhagen	559	Smyrna	375
Sianfu	1,000	Riga	558	Montevideo	374
Bombay	979	Marseilles	551	Bristol	363
Hamburg	931	Dresden	548	New Orleans	361
Han-Kow	900	Prague	541	Düsseldorf	358
Budapest	880	Detroit	537	Washington	353
Warsaw	872	Lyons	524	Havana	351
Birmingham	868	Madras	520	Hang-chow	350
Tientsin	850	Cologne	517	Minneapolis	343
Liverpool	767	Breslau	512	Palermo	342
Manchester	738	Hyderabad	501	Bucharest	338
St. Louis	734	Soochow	500	Nuremberg	333
Boston (U.S.A.)	733	Sheffield	476	Alexandria	332
Sydney (N.S.W.)	725	Mexico	471	Antwerp	321
Peking	700	Leeds	459	Edinburgh	320
Shanghai	700	Rotterdam	459	Seattle	313
Naples	692	Buffalo	454	Charlottenburg	305
Brussels	663	São Paulo	450	Tiflis	303
Cairo	654	San Francisco	448	Hanover	302

r strength, flavour and purity.

THE PANAMA CANAL.

Comparative Distances (in Sea Miles) by new and old routes.

From LIVERPOOL to various points.

	Via Panama Canal.	*Via Cape Horn.*
Callao	5910 ...	... 10,230
Honolulu	9287 ...	... 13,941
Iquique	6570 ...	... 9527
Panama	4570 ...	... 11,261
San Francisco	7847 ...	... 13,764
Seattle	8626 ...	... 14,296
Valparaiso	7185 ...	... 8998
Vancouver	8647 ...	... 14,568
Wellington (N.Z.) ...	11,058 ...	... 11,981

From NEW YORK to various points.

Callao	3332 ...	... 9820
Honolulu	6723 ...	... 13,531
Iquique	4006 ...	... 9117
Manila	11,405 ...	... 11,584*
Panama	2012 ...	... 10,851
San Francisco	5289 ...	... 13,358
Seattle	6068 ...	... 13,886
Sydney (N.S.W.) ...	9704 ...	... 13,051†
Valparaiso	4627 ...	... 8588
Vancouver	6089 ...	... 14,158
Wellington (N.Z.) ...	8500 ...	... 11,571
Yokohama	9714 ...	... 13,043*

From SAN FRANCISCO.

Hamburg	8366 ...	... 14,121
Jamaica	3867 ...	... 12,722
Marseilles	8343 ...	... 13,492
Montreal	6460 ...	... 13,941
New Orleans	4697 ...	... 13,775
Para	5621 ...	... 10,754

* Via Suez. † Via C. of Good Hope.

EPPS'S COCOA, Grateful and Comforting.

ANNUAL RAINFALL AT VARIOUS PLACES.

Place.	Inches.
ALGERIA—	
Algiers	27
ARGENTINA—	
Buenos Ayres	37
AUSTRALIA—	
Adelaide	21
Brisbane	36
Hobart	24
Melbourne	29
Perth	33
Sydney	48
AUSTRIA AND HUNGARY—	
Budapest	24
Vienna	25
BELGIUM—	
Brussels	29
BRAZIL—	
Para	92
Rio de Janeiro	43
BRITISH ISLES—	
ENGLAND—	
Cornwall—	
South Coast	42
Inland	48
North Coast	36
Cumberland—	
†Lake District	58
Derbyshire—	
South	26-27
Peak District	40-50
Devonshire—	
South Coast	31-32
North Coast	40
§East Coast	24-25
Lancashire—	
East	32-36
West	33
Mid.	40-45
Bolton	57
Lincolnshire—	
Fen District	22
London	25
Thames Valley	29
South Coast	28-30
WALES—	
West Coast	45
North Wales—	
Coast District	35
Snowdon District	60
SCOTLAND—	
North Coast	35

Place.	Inches.
East Coast	30
West Coast	60
Southern Lowlands	45
IRELAND—	
South-West Coast	60
North-West Coast	50
South Coast	35
East Coast	30-40
CANADA—	
Edmonton (Alberta)	18
Halifax (N.S.)	57
Montreal	42
Ottawa	33
Vancouver (City)	60
Winnipeg	21
CHINA—	
Hong-Kong	85
Peking	25
Shanghai	44
DENMARK—	
Copenhagen	22
ECUADOR—	
Quito	42
EGYPT—	
Alexandria	8
Cairo	1-4
EAST INDIES—	
Singapore	92
FRANCE—	
Bordeaux	33
Marseilles	23
Paris	22
GERMANY—	
Berlin	23
Breslau	22
Munich	35
GREECE—	
Athens	16
HOLLAND—	
Amsterdam	27
INDIA—	
Bombay	75
Calcutta	65
Cherrapunji	*458
Delhi	28
Madras	51
Colombo (Ceylon)	84
ITALY—	
Florence	41
Milan	38
Naples	33
Nice	29

Place.	Inches.
Rome	30
JAPAN—	
Tokio	58
MEXICO—	
Mexico City	23
NORTH ATLANTIC—	
Bermudas	55
Madeira	27
NEW ZEALAND—	
Auckland	45
Christchurch	25
Wellington	50
NORWAY—	
Bergen	89
Christiania	25
PALESTINE	
Jerusalem	25
PHILIPPINE IS.—	
Manila	76
PORTUGAL—	
Lisbon	29
RUSSIA—	
Astrakhan	6
Moscow	21
Petrograd	17
S. AFRICA—	
Cape Town	25
Durban	41
Johannesburg	30
SPAIN—	
Madrid	16
SWEDEN—	
Stockholm	18
SWITZERLAND—	
Berne	46
Geneva	32
Zurich	45
TURKEY—	
Constantinople	29
UNITED STATES—	
Chicago	34
New York	43
San Francisco	23
Washington (D.C.)	44
URUGUAY—	
Montevideo	44
VENEZUELA—	
Caracas	30
W. INDIES—	
Havana	52
San Domingo	103

† Heaviest rainfall in the British Isles is at Seathwaite, Cumberland (130 ins.)
§ Lightest rainfall in the British Isles is at Shoeburyness, Essex (19 ins.)
* In the Khasi Hills, Assam; the heaviest rainfall in the World.

Monarch Cocoa has a perfect flavour.

ELECTRICAL UNITS.

PRACTICAL UNITS.

Current.—Ampere. 1 micro-ampere $=\frac{\text{ampere}}{1{,}000{,}000}$. 1 milliampere $=\frac{\text{ampere}}{1{,}000}$.

Resistance.—Ohm. 1 microhm = one-millionth of an ohm. 1 megohm = one million ohms Ω.

Electromotive Force.—Volt. 1 microvolt = one-millionth of a volt.

Power or Activity.—Watt = one-746th part of a horse power. Kilowatt = one thousand watts = 1⅓ horse power (about).

Energy or Work.—Joule = one watt-second = 0·7372 foot pounds.

Board of Trade Unit = 1 kilowatt-hour = 3·6 million Joules = 1½ horse power hours.

Capacity.—Farad. 1 microfarad = one millionth of a farad.

Quantity.—Coulomb.

Self and Mutual Inductance.—Henry, Quadrant, or Secohm; these are all names for the same unit. The Henry is that most usually employed.

COMMONLY EMPLOYED ELECTRICAL ABBREVIATIONS AND SYMBOLS.

B.T.U. = Board of Trade Unit.

Ω = megohm. ω = ohm, thus, 10ω = ten ohms.

⊣⊢ signifies capacity.

D.P. = double pole. S.P. = single pole. H.R. = high resistance. H.C. = high conductivity. D.C.C. = double cotton covered (of wires). G.P. = Gutta-percha. I.R. = india-rubber; sometimes also insulation resistance. W.I. = wrought iron. C.I. = cast iron. L.S.W. = London standard wire gauge. B.W.G. = Birmingham wire gauge. S.W.G. = standard wire gauge. When used in describing cables, a fraction such as 11/16 means 11 of number 16 wire, the 16 referring to some particular wire gauge.

The firm of EPPS start

E.M.F = electricity moving force, or electro-motive force.

P.D. = potential difference, or pressure difference.

Virt. Amps. = virtual amperes, or effective amperes, and refers to an alternating current measured in terms of the heat it produces in a given resistance.

Virt. Volts = virtual volts, or effective volts, and refers to an alternating voltage measured in terms of the heat it produces in a given resistance.

$\sqrt{\text{M. S.}}$, or **R. M. S.** means the square root of the mean square, and is used concerning alternating currents and voltages; it is precisely equivalent to the expression "virtual or effective amperes or volts."

∞ = frequency, and means the number of alterations an alternating current or voltage undergoes per second.

GREEK ALPHABET.

Capitals.	Small Letters.	English Equivalents in Sound.	Name in English.	Capitals.	Small Letters.	English Equivalents in Sound.	Name in English.
A	α	a	Alpha.	N	ν	n	Nu.
B	β	b	Bēta.	Ξ	ξ	x	Xi.
Γ	γ	g	Gamma.	O	o	o *short*	Omīcron.
Δ	δ	d	Delta.	Π	π	p	Pi.
E	ϵ	e *short*	Epsīlon.	P	ρ	r	Rho.
Z	ζ	z	Zēta.	Σ	$\sigma\,\varsigma$	s	Sigma.
H	η	e *long*	Eta.	T	τ	t	Tau.
Θ	θ	th	Thēta.	Υ	υ	u	Upsīlon.
I	ι	i	Iōta.	Φ	ϕ	ph	Phi.
K	κ	k	Kappa.	X	χ	ch	Chi (*ki*).
Λ	λ	l	Lambda	Ψ	ψ	ps	Psi.
M	μ	m	Mu.	Ω	ω	o *long*	Oměga.

manufacturing cocoa in 1839.

LIST OF ABBREVIATIONS.

Abp.—Archbishop.
A.D.—Anno Domini, in the year of our Lord.
A.D.C.—Aide-de-Camp.
Ad lib.—At pleasure.
A.M.—Morning, before mid-day.
A.M.D.G.—To the greater glory of God.
A.R.A.M.—Associate of the Royal Academy of Music.
Anon.—Anonymous, of unknown authority.
B.A.—Bachelor of Arts.
Bart.—Baronet.
B.C.—Before Christ.
B.D.—Bachelor of Divinity.
B.Sc.—Bachelor of Science.
C.—Means 100; sometimes Centigrade.
Camb.—Cambridge.
Cantab.—Of Cambridge.
Capt.—Captain.
C.B.—Companion of the Bath.
C.C.—County Councillor.
c.c.—Cubic Centimetre.
C.E.—Civil Engineers.
Cf.—Compare.
C.M.G.—Companion of Order of St. Michael and St. George.
C.M.S.—Church Missionary Society.
Col.—Colonel.
Co.—Company.
C.O.D.—Cash on Delivery.
Cwt.—Hundredweight.
D.C.L.—Doctor of Civil Law.
D.C.M.—Distinguished Conduct Medal.
D.D.—Doctor of Divinity.
D.F.C.—Distinguished Flying Cross.
D.G.—By the Grace of God.
Do.—Ditto, the same.
D.Sc.—Doctor of Science.
D.S.C.—Distinguished Service Cross.
D.S.O.—Distinguished Service Order.
D.V.—God willing.
Ed.—Editor.
E.G.—For Example.
E. & O.E.—Errors and omissions excepted.
Esq.—Esquire.
Etc.—And so forth.
Ex.—Example, out of, or late.
F.D.—Defender of the Faith.
F.M.—Field Marshal.
F.P.—Fire Plug.
F.G.S.—Fellow Geological Society
F.R.C.S.—Fellow Royal College of Surgeons.
F.R.G.S.—Fellow Royal Geographical Society.
F.R.H.S.—Fellow of the Royal Horticultural Society.
F.R.S.—Fellow Royal Society.
Gen.—General.
G.C.B.—Grand Cross of the Bath.
G.P.O.—General Post Office.
G.R.—Georgius Rex.
H.A.C.—Honourable Artillery Company.
H.M.S.—His or Her Majesty's ship or Service.
Hon.—Honourable.
H.R.H.—His or Her Royal Highness.
Ibid.—In the same place.
I.E.—That is.
Imp.—Imperial.
Incog.—Unknown.
Inst.—Of this month.
I.O.U.—I owe you.
J.P.—Justice of the Peace.
Junr.—Junior.
K.C.—King's Counsel.
K.G.—Knight of the Garter.
Kt.—Knight.
Lat.—Latitude.
Lieut.—Lieutenant.
LL.B. Bachelor of Laws.
LL.D.—Doctor of Laws.
Loc. Cit.—Loco Citato, in the place before cited.
Long.—Longitude.
L.R.C.P.—Licentiate of Royal College of Physicians.
M.—Monsieur.

EPPS'S COCOA, Grateful and Comforting.

Maj.—Major.
M.A.—Master of Arts.
Mus B.—Bachelor of Music.
M.C.—Master of Ceremonies.
M.C.—Military Cross.
M.C.P.—Member of the College of Preceptors.
M D.—Doctor of Medicine.
Mdlle. or Mlle.—Mademoiselle.
Mem.—Memorandum.
Messrs.—Messieurs, or Gentlemen.
M.G.C.—Machine Gun Corps.
M M.—Military Medal.
Mme.—Madame.
M.P.—Member of Parliament.
M.R.C.S.—Member of the Royal College of Surgeons.
MS.—Manuscript.
MSS.—Manuscripts.
N.B.—Take Notice.
N.C.O.—Non-commissioned Officer.
Nem. Con.—None contradictory
N.S.P.C.C.—National Society for Prevention of Cruelty of Children.
O.B.E.—Order of the British Empire.
Obs.—Obsolete.
O.C.—Officer Commanding.
O.H.M.S.—On His Majesty's Service.
O.M.—Order of Merit.
Oxon.—Oxford.
P.C.—Police Constable, or Privy Councillor.
Per Cent.—In or on the hundred.
Ph.D.—Doctor of Philosophy.
Pinx.—(Pinxit) painted it.
P.M.—After mid-day.
P.O.O.—Post Office Order.
pp.—Pages.
PP.C.—(Pour prendre Congé) to take leave.
P.R.A.—President of Royal Academy.
Preb.—Prebendary.
Prox.—Next.
Pro. Tem.—For a time, till a settlement takes place
P.S—Postscript, written after.
P.T.O.—Please turn over.
Q.V.—(Quod vide) which see.
Qy.—Query.
R.A.—Royal Academy; Royal Artillery.
R.A.F.—Royal Air Force.
R.A.M.C.—Royal Army Medical Corps.
R.A.S.C.—Royal Army Service Corps.
R.E.—Royal Engineers.
Rev.—Reverend.
R.F.A.—Royal Field Artillery.
R.G.A.—Royal Garrison Artillery.
R.H.A.—Royal Horse Artillery.
R.I.P.—Rest in Peace.
R.M.—Royal Mail.
R.M.S.—Royal Mail Steamer.
R.N.—Royal Navy.
R.N.R.—Royal Naval Reserve.
R.N.V.R.—Royal Naval Volunteer Reserve.
R.S.O.—Railway Sub-Office.
R.S.P.C.A.—Royal Society for the Prevention of Cruelty to Animals.
R.S.V.P.—Answer, if you please.
R.T.S.—Religious Tract Society.
Rt. Hon.—Right Honourable.
Sec.—Secretary.
SS.—Saints; sometimes Steamship.
S.P.C.K.—Society for Promoting Christian Knowledge.
S.P.G.—Society for the Propagation of the Gospel
Ult.—Last.
U.S.A.—United States of America.
V—Against.
V.A.D.—Voluntary Aid Detachment.
V.C.—Victoria Cross.
Ven.—Venerable.
Xt.—Christ.
Xmas.—Christmas.
Y.M.C.A.—Young Men's Christian Association.

Children thrive on EPPS'S COCOA.

CHINA MARKS.

EPPS'S contains the maximum

TIME AND WATCH ON SHIPS.

On board ship the day is divided into Seven Watches, and the crew into two divisions—the Starboard (on the steersman's right) and the Port (on the steersman's left). These divisions divide the watching and the working of the ship into convenient and equal portions, and enable the crew to watch and work at alternate times. During the day there are **Seven Watches**:—

Afternoon Watch	from Noon to	4 P.M.
First Dog	,, 4 to	6 ,,
Second Dog	,, 6 to	8 ,,
First	,, 8 to	12 ,,
Middle	,, 12 to	4 A.M.
Morning	,, 4 to	8 ,,
Forenoon	,, 8 to	12 ,,

The **Time** is kept by means of bells, which are struck at frequent intervals, and in a way understood by the crew.

AVERAGE WEIGHT OF ADULTS AND CHILDREN.

MEN.		WOMEN.		BOYS.		GIRLS.	
Height. Ft. ins.	Weight. St. lbs.	Height. Ft. ins.	Weight. St. lbs.	Age.	Weight. St. lbs.	Age.	Weight. St. lbs.
5 2 ..	9 0	4 10 ..	7 0	5 ..	3 8	5 ..	2 12
5 3 ..	9 7	4 11 ..	7 4	6 ..	3 12	6 ..	3 1
5 4 ..	9 13	5 0 ..	7 7	7 ..	4 1	7 ..	3 6
5 5 ..	10 2	5 1 ..	7 12	8 ..	4 4	8 ..	3 10
5 6 ..	10 5	5 2 ..	8 2	9 ..	4 9	9 ..	4 1
5 7 ..	10 8	5 3 ..	8 9	10 ..	4 13	10 ..	4 6
5 8 ..	11 1	5 4 ..	9 2	11 ..	5 8	11 ..	4 13
5 9 ..	11 8	5 5 ..	9 9	12 ..	5 9	12 ..	5 8
5 10 ..	12 1	5 6 ..	9 13	13 ..	6 0	13 ..	6 5
5 11 ..	12 6	5 7 ..	10 8	14 ..	6 8	14 ..	7 0
6 0 ..	12 10	5 8 ..	11 4	15 ..	7 6	15 ..	7 8

f nourishment in cocoas.

FIRST AID HINTS.

Apoplexy. Move patient as little as possible. Loosen clothing, particularly round neck, and place patient with head slightly raised in a cool apartment. Apply cold water to head; if extremities be cold apply heat. No stimulants must be given unless ordered by doctor.

Broken Bones. Gently and firmly draw out the injured limb to prevent injury to flesh from possible splintered bone, and at once render immovable by means of splints and bandages. If in the arm apply two bandages outside the clothes, one above and one below the fracture, and suspend from the neck with a sling. If in the leg apply a splint, bandage as above, and remove the patient on an improvised stretcher such as a door, ladder, hurdle, etc.

Burns and Scalds. Very carefully remove the clothes from the burnt or scalded part, if necessary by cutting or washing away charred remains, taking care not to remove skin from raw surfaces; wash with solution of mild antiseptic, protect with clean soft linen cloth or bandage. If the part is anointed with ointment or other oily preparation it helps to prevent the dressing sticking.

Drowning and Unconsciousness following Electric Shock. Send at once for medical aid, but proceed to treat patient on the spot. Restore breathing by artificial respiration; do not relax efforts unless a doctor pronounces life extinct. After consciousness returns, actively promote warmth and circulation.

Fainting. Patient should be laid on his back, and clothing, if possible, loosened around the neck, chest, and abdomen. Give plenty of fresh air while sprinkling the face and chest with cold water; smelling salts should be used if available.

Stimulants, brandy or sal volatile, should be given when able to swallow. If face is flushed no stimulants must be given, but the head raised slightly. After recovery some rest should be taken.

Frost-Bite. Rub part with snow; keep in cold room. When circulation returns wrap in cotton wool or flannel. Do not warm at fire.

Insect Stings. Squeeze out the sting by placing over it the hollow of a key and pressing gently. Afterwards apply washing soda, dilute ammonia, or sal volatile.

Sunstroke. Loosen clothing about neck; keep in shade; raise head and apply coldest water available; do not give stimulants.

Wounds. If slight, wash, preferably with water containing a small quantity of boracic or carbolic acid; close by a strip of adhesive plaster placed at right angles in such a way that any matter that forms can escape.

For deeper wounds, sponge with clean water containing antiseptics, fix parts together in their natural position by strips of adhesive plaster as above, applying a pad of boracic lint or cotton-wool saturated with a solution of boracic acid, then cover this with a bandage.

Monarch Cocoa is pure and soluble.

RISK OF INFECTION IN COMMON COMPLAINTS.

Disease.	Usual period between infection and appearance of symptoms.	Extreme limits between which infection may occur.	Necessary period of Quarantine during which Patient may be infectious.
Chicken Pox	13 days	Up to 14 days	Until scales have fallen off.
Diphtheria	2—4 ,,	1—7 ,,	Fourteen days after disappearance of Diphtheritic membrane, and whilst sore throat or mucous discharge continues.
German Measles	14 ,,	10—21 ,,	Twenty days from commencement.
Influenza	3 ,,	2—5 ,,	Till convalescence has advanced sufficiently for patient once more to follow his ordinary occupation.
Measles	14 ,,	8—18 ,,	Until scaling and coughing have ceased, about 21 days also during incubation of the disease.
Mumps	14—21 ,,	10—25 ,,	About 14 days after apparent recovery; about four weeks in all.
Scarlet Fever	2—3 ,,	1—5 ,,	Until scaling has ceased; six to eight weeks.
Small Pox	12 ,,	8—15 ,,	Until all scabs have fallen off.
Typhoid or Enteric Fever	14—21 ,,	Indefinite	Until after convalescence, and patient ceases to be a germ distributor.
Whooping Cough	8 ,,	2—12 days	Six to nine weeks from the commencement of cough or until five weeks after first whoop.

POISONS AND THEIR TREATMENT.

GENERAL PRINCIPLES. Send for doctor immediately, but in the meantime do not delay to hasten the elimination of the poison from the system by means of emetics or purging. After giving an emetic always wait for it to act before administering anything further.

In cases of poisoning with corrosive or highly irritant substances do not use emetics as local injury is likely to follow.

Corrosive and highly irritant poisons include the mineral acids, acid salts, oxalic acids and salts, strong acetic acid, caustic soda, caustic potash, strong ammonia, and carbolic acid.

Administer the appropriate antidote, if one be known, and when the poison has been eliminated as far as possible follow with demulcents or drinks of a soothing character.

See opposite.

COMMON EMETICS:—

Ipecacuanah Wine, ½-ounce to ¾-ounce.

Mustard, one tablespoonful in a tumblerful of warm water.

Table or Cooking Salt, one tablespoonful dissolved in warm water.

Zinc Sulphate, 10 to 30 grains (as much as can be heaped upon a shilling) dissolved in a tumblerful of warm water.

Tickling the back of the throat by means of a feather or the finger.

DEMULCENTS:—Milk, Salad Oil, Thick Gruel (2 ounces to a pint), Raw White of Egg, Linseed Tea.

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POISONS—continued.

Treatment for Special Poisons whilst awaiting Doctor.

(When emetics are advised, it is assumed that the poison has not had time to be all absorbed by the system and also that the throat and stomach have not received such injuries as to render their use inadvisable).

Alcohol. Give emetic, keep patient roused.

Antimony Salts. Form their own emetic; give warm water; guard against collapse by means of stimulants and warmth.

Arsenic (Sheep Dips, Weedkillers, etc.). Give emetic unless the poison taken was highly alkaline.

Carbolic Acid and Disinfectants. Use discretion as to whether to give emetic. Give ½oz. Epsom Salts in milk, followed by an abundance of milk or sweet oil. Give stimulants if necessary.

Deadly Nightshade (Be ladonna), Foxglove (Digitalis), Hyoscyamus, Ptomaines (Alkaloidal Poisons developed in decomposed Meat), Strychnine, Woody Nightshade (Dulcamara), and many other Vegetable Poisons. Administer emetic and give 20 grains of tannin in water or strong overdrawn tea. Give stimulants and assist respiration if necessary.

Gas. Carry to fresh air and resort to artificial respiration.

Laudanum, Morphia and Chlorodyne. Give emetic, followed by 5 grains of potassium permanganate in tumblerful of water. Keep patient roused and freely give stimulant, such as strong coffee.

Lead or Lead Salts. Give emetic. Afterwards ½-oz. of Epsom Salts or Glauber's Salts in a tumblerful of water.

Mercury (Corrosive Sublimate, Red and White Precipitate). Give emetic, followed by milk or white of egg

Mineral Acids and Acid Salts except Oxalic Acid and its Salts). Give ½-oz. of magnesia, powdered chalk or whiting stirred up in water, or ½-oz. bicarbonate of soda or potash dissolved in water. No emetic, but give milk, sweet oil, or white of egg freely.

Oxalic Acid and its Salts. Give an emetic if the poison has just been taken, afterwards give ½-oz. powdered chalk or whiting stirred in water, but on no account give magnesia or bicarbonate of soda or potash, the combination of these with oxalic acid being as poisonous as the acid itself

Phosphorus (Rat Poison or Beetle Paste). Give emetic, followed by 30 drops of Sanitas in 1-oz of water four times during the first hour, or 2½ grains of copper sulphate (blue vitriol) dissolved in half a cup of water; afterwards give demulcents, but avoid oil.

Potash, Soda or Ammonia. No emetic. Give as much citric acid or tartaric acid as will cover a shilling, dissolved in a cupful of water, or a tablespoonful of vinegar or lemon juice in the same amount of water; follow with sweet oil, milk or white of egg.

Silver. Give emetic—a tablespoonful of table or cooking salt for preference, as this forms an insoluble compound when mixed with silver salts.

Zinc Salts and Killed Acid. Give ½-oz of potassium or sodium bicarbonate dissolved in water, followed by copious draughts of milk.

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GEORGE PHILIP AND SON, LTD., PRINTERS, LONDON.

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TO SUIT EVERY PALATE

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OF HIGHEST FOOD VALUE

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NOURISHMENT IN A CUPFUL OF
EPPS'S THAN IN AN EQUAL
QUANTITY OF ANY OTHER COCOA

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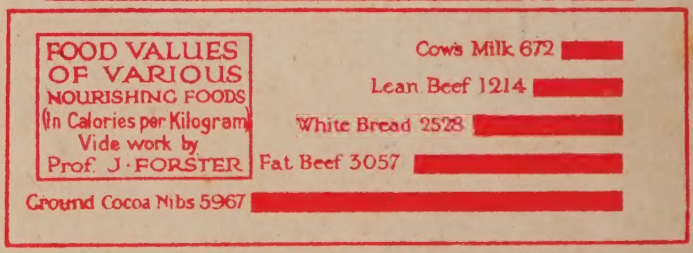

JAMES EPPS & Co., Ltd.
Cocoa and Chocolate Manufacturers,
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Blackfriars, London, S.E.